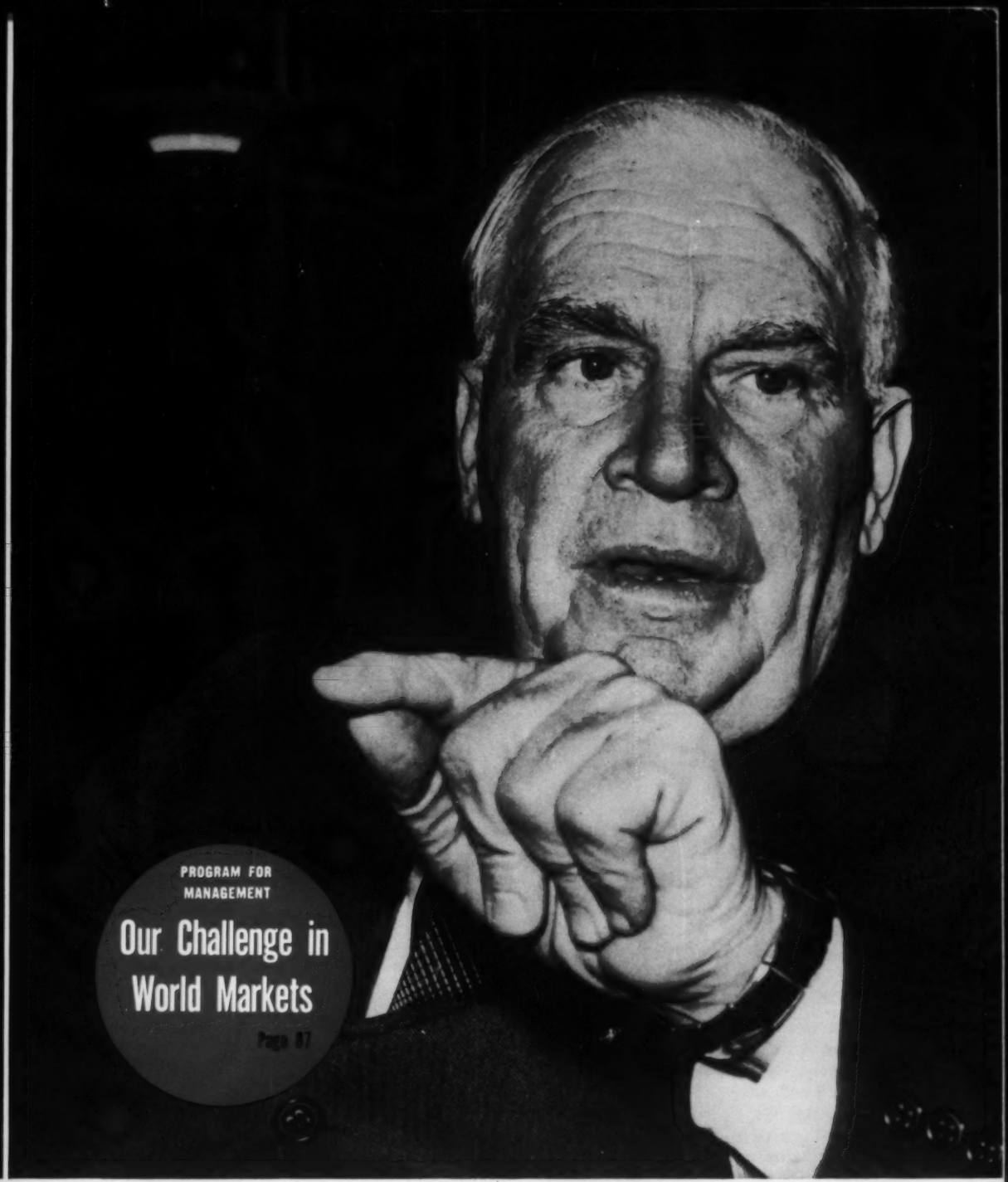
STEEL
The Metalworking Weekly
A PENTON PUBLICATION
MARCH 13, 1961



PROGRAM FOR MANAGEMENT

Our Challenge in World Markets

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Luther Hodges, U. S. Secretary of Commerce

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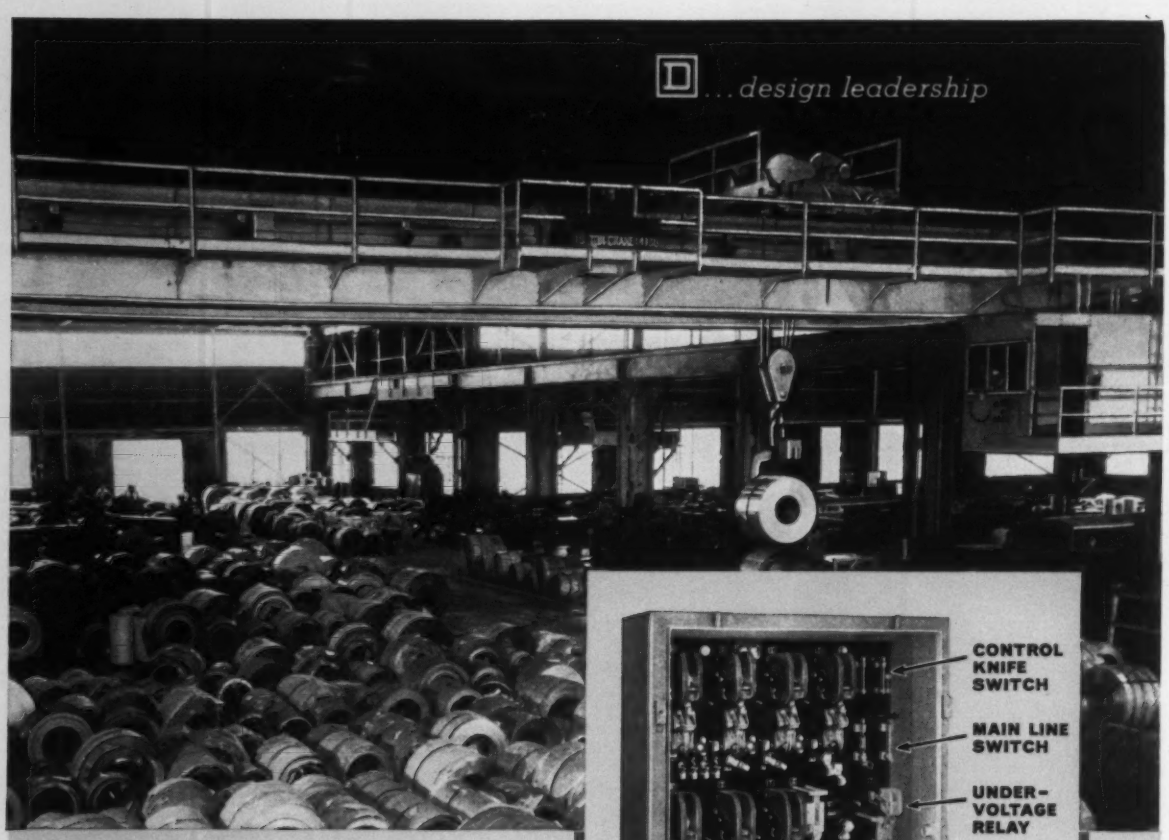

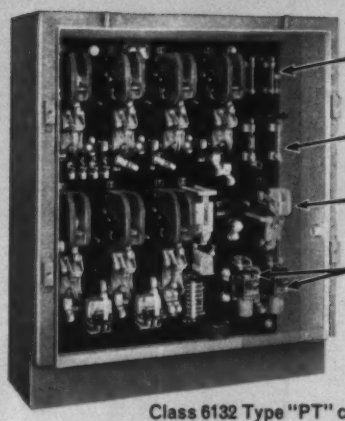

Class 6132 Type "PT" controller with self-contained protection

NOW! LOW-COST MAGNETIC CONTROL FOR DC CRANES

Compact ***EC&M Type "PT" Control*** *—a logical replacement for manual control*

• On any DC crane application up to 55 hp, 230 volts, you now can have all the advantages of *full magnetic* control where manual control formerly was purchased purely on the basis of price. Whether you're modernizing existing cranes or ordering new ones, you'll find type "PT" control far superior to manual control.

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Full Protection • *now* available with self-contained undervoltage and overload protection. Also supplied without protection for use with separate protective panel.

Extra Safety • Exclusive Wright dynamic lowering circuit is the simplest and safest circuit for crane hoist service, gives maximum hook speed without danger of overspeeding. Controller completely enclosed.

Automatic Acceleration • relays adjustable from 0.2 second or more per step. Automatic acceleration reduces wear on motors and control.

Plugging Protection • rectifier-type plugging relay operates from motor counter-emf.

Choice of Master Switches • dynamic lowering controllers furnished with 4-point speed control. Choice of 3 or 4 point master switches on reversing plugging controllers.

Heavy-Duty Construction • mill-type contactors, sturdy design throughout make Type "PT" control suitable for mill accessory drives as well as light industrial cranes. Available in NEMA Type 1 general purpose, Type 1 gasketed, or NEMA Type 3 weatherproof enclosures.

Write for Bulletin 6132 for details on "PT" control with protection

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EC&M DIVISION • CLEVELAND 28, OHIO

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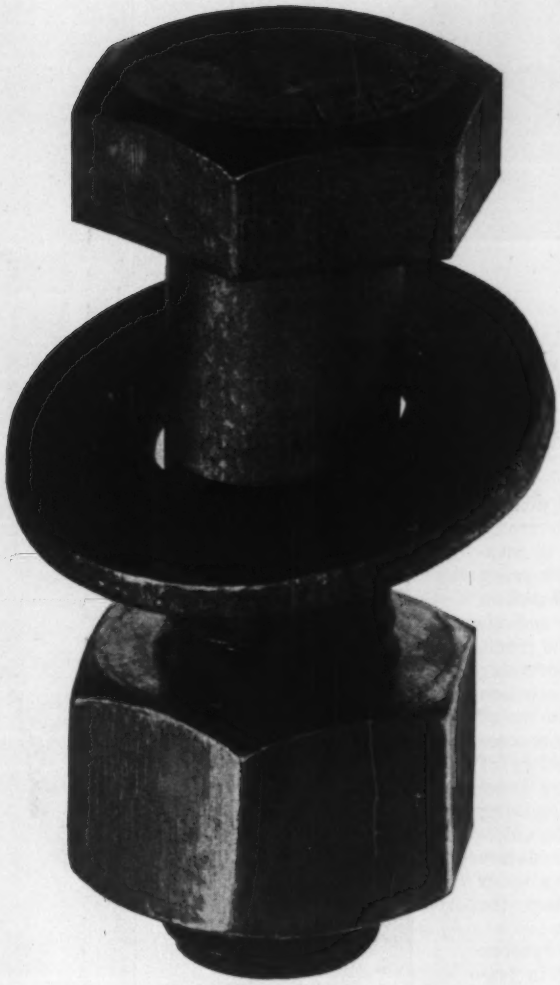

Bethlehem can make fast delivery of new high-strength bolts

Bethlehem stocks the new high-strength bolts for structural steel joints (large head, short thread) in all popular sizes—⅝ to 1⅛-in. diameters, inclusive, in usual lengths, available now. Available soon—1¼-in. diameter, in usual lengths.

- We will continue to maintain complete stocks of ⅞ to 1¼-in. diameter high-strength bolts in all lengths with regular heads and A.S.A. Standard thread lengths.
- Hardened washers, made to both the new and old standards, are available in all types and sizes for quick shipment.
- Our new booklet 563A, "High-Strength Bolting for Structural Joints," contains the latest specifications, and complete information. Get your copy from the local Bethlehem office, or write to us at Bethlehem, Pa.

Steel

for Strength
. . . Economy
. . . Versatility

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

HOW TO MEASURE A NOISE YOU CAN'T HEAR

Vibrations detected by a sensitive pickup, then amplified and analyzed by electronic equipment, enable SKF engineers to measure almost imperceptible noises occurring in rotating ball and roller bearings. Based on long-continued investigation, noise and vibration appear to be almost solely the result of minute deviations in the surface geometry of the rolling elements and rings. Detection of this surface "waviness" as a source of bearing noise is an important SKF contribution towards solving the problem of producing quieter, smoother running bearings. Methods developed for minimizing waviness have already resulted in the quietest bearings yet made for electric motors and other equipment, as well as even greater precision in the high quality bearings for aero-space and similar applications.

Advanced research is one of the reasons why SKF maintains its leadership in producing finer rolling contact bearings. Whatever bearings you need—ball, cylindrical roller, spherical roller, tapered roller or precision miniature types – you'll find SKF your assurance of dependable performance. SKF Industries Inc., Philadelphia 32, Pa.

6102

SKF MOTION ENGINEERING

Advanced ball and roller bearing technology

REMEMBER?

'Twas a time when the cigar store Indian was a red-hot salesman. Years ago, true, but don't underestimate his selling power. He was good.

Today's parallel is the popular mechanical vending machine, used in selling so many items. As with any salesman, the more economical his cost, the greater the profits. To manufacturers of vending machines Wiedemann Turret Punch Presses offer a way to cut piercing costs 60% to 90%.

One manufacturer of vending machines placed his product on the market in April instead of a contemplated September date, at phenomenal savings in permanent tooling. The "Wiedemann Method" eliminated their usual problems in modifying hard tooling to keep up with the engineering changes.

Metal fabricators of components for similar equipment in every industry can realize the same savings. For, wherever there is need for accurate locating and producing openings in sheet metal, plates and many laminated materials, to customers' designs, the "Wiedemann Method" sets a new standard for short run piercing.

Time studies of your work will show you how a Wiedemann Turret Punch Press will materially cut your piercing costs and increase your production efficiency.

From the versatile 150 ton R-15 down to the hand operated R-2, there's a Wiedemann for your short run piercing requirements.

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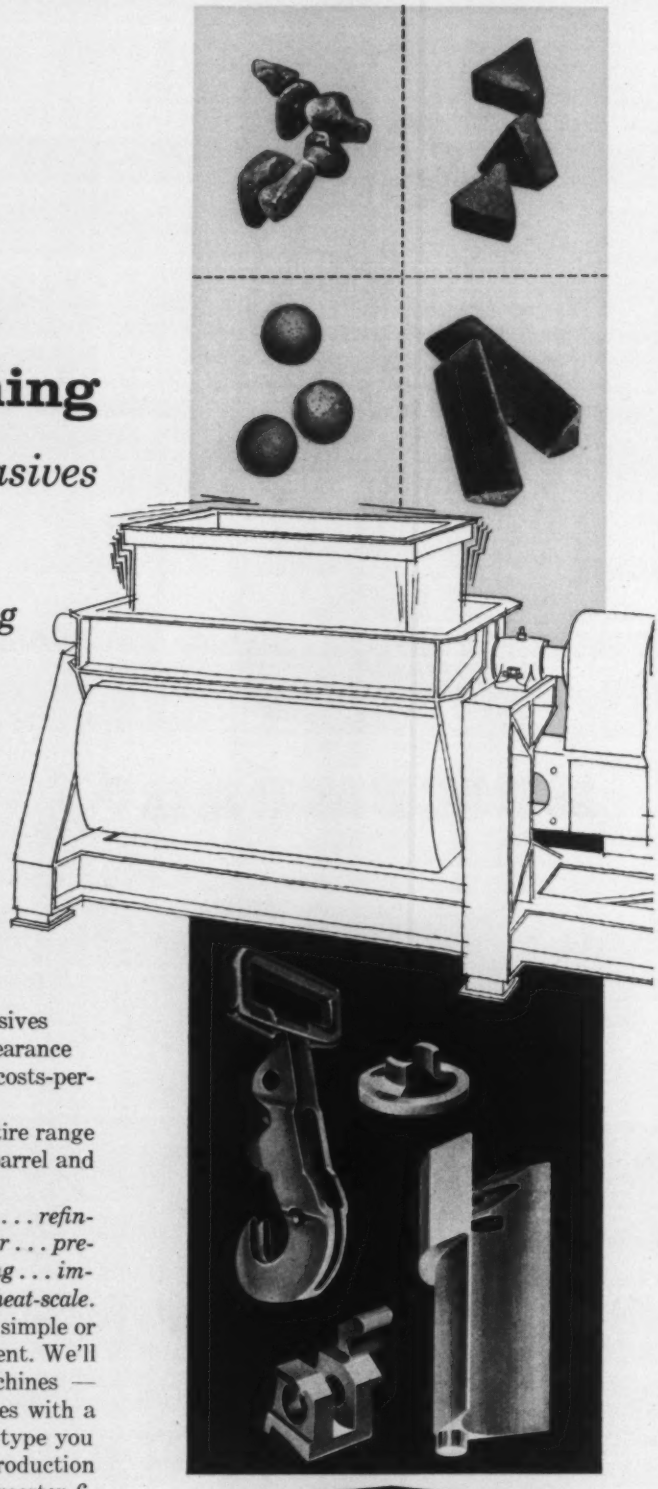
...with TUMBLEX® abrasives

... in every type of rotating or vibratory equipment



Keeping pace with the latest advancements in barrel finishing equipment, Norton TUMBLEX abrasives are first in the field for best results with vibratory machines . . . developed for faster, lower cost finishing of the widest range of parts, especially the most complicated.

The recognized advantages of TUMBLEX abrasives help assure improved product quality and appearance — plus the fastest, easiest way to cut finishing costs-per-piece . . . by this new vibration method.

These advantages are also brought to the entire range of barrel finishing operations of both rotating-barrel and vibration types, including:

Removing burrs . . . smoothing off feather edges . . . refining surface finish . . . burnishing for luster or color . . . preparing surfaces for painting, enamelling or plating . . . imparting matte finish . . . removing dirt, grease or heat-scale.

Send your samples of parts — large or small, simple or intricate — to our Sample Processing Department. We'll barrel finish them on the most suitable machines — vibratory or rotating — and return the samples with a report on the TUMBLEX abrasives and machine type you need to improve product quality and cut production costs. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

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G-409

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Editor at Work

The editor is Jack Botzum (right). He's interviewing Secretary of Commerce Luther Hodges. The secretary appears on our cover this week, and his comments turn up in the fifth installment of our 1961 Program for Management (Page 87).

The interview with Mr. Hodges came several weeks ago and was one of the first individual sessions the new secretary granted to any reporter.

Wheezey-Gheezey

In the next couple of weeks, you'll be reading in our tech section about a special sizing lathe called the Wheezey-Gheezey. Lockheed Aircraft Corp. personnel had a habit of referring to any special setup as a wheezey-gheezey. When they came up with the lathe, which was decidedly unusual, the name stuck.

Delay

Note that we didn't assign an issue date to Wheezey-Gheezey. That's because we were burned a while back. On Feb. 20, we blithely and confidently announced that a roundup on fasteners would appear on Page 37 of that issue. As several readers pointed out to us, with justified testiness, it was not on Page 37 or any other page of that magazine. Reed Trask, the associate editor responsible for the article, ran into several complications in mid-February, so he didn't get it done in time. When we learned of the delay, we had already gone to press, with the misinformation indelibly recorded.

But the story is ready now (on Page 80, we hope), and it's well worth waiting for.

Hot Dog Tale

Once upon a time a man lived by the side of the road and sold hot dogs. He was hard of hearing, so he had no radio. He had trouble with his eyes, so he read no newspapers and never watched television. But he sold good hot dogs and put signs up on the highway telling people so.

And people bought. He increased his hot dog and bun orders. He bought a bigger stove.

His son came home from college to help out. He said that the nation was in a recession.

His father thought: "He has been to college. He reads and can hear well. He must know."

So the father cut his hot dog and bun orders and curtailed the expense of erecting and maintaining his signs. His sales fell off.

"You're right, son," said the father to his boy. "We are in the middle of a recession."

Hooray for Engineers

We've always known that engineers were smart, but now we have proof that they are promotionally minded too.

To encourage early registration for the 1961 ASTME convention and exposition, the American Society of Tool & Mfg. Engineers will give a $10,000 accidental death and dismemberment policy to the people who register by May 1—effective from the time they leave home until they return. The show is May 22-26 at the New York Coliseum.

Poker

Poker playing experts claim that the game reveals the participants' personality as few other activities can. We doubt the truth of the generality, but, for what they're worth, here are some notes on a recent game among five editors. The kibitzer was Geraldine, cleaning woman on our floor, frustrated writer, and our night editor.

Editor Walter Campbell—"He almost always wins."

Associate Managing Editor John Morgan—"Veteran bridge player, novice poker player, but learning fast."

News Editor Bill Dean—"Aggressive. Wins big; loses big."

Associate Editor Don Hammerstrom—"Steady, solid, conservative."

Pittsburgh Editor Bill Wallace—"He likes a game he calls seven card zowie."

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

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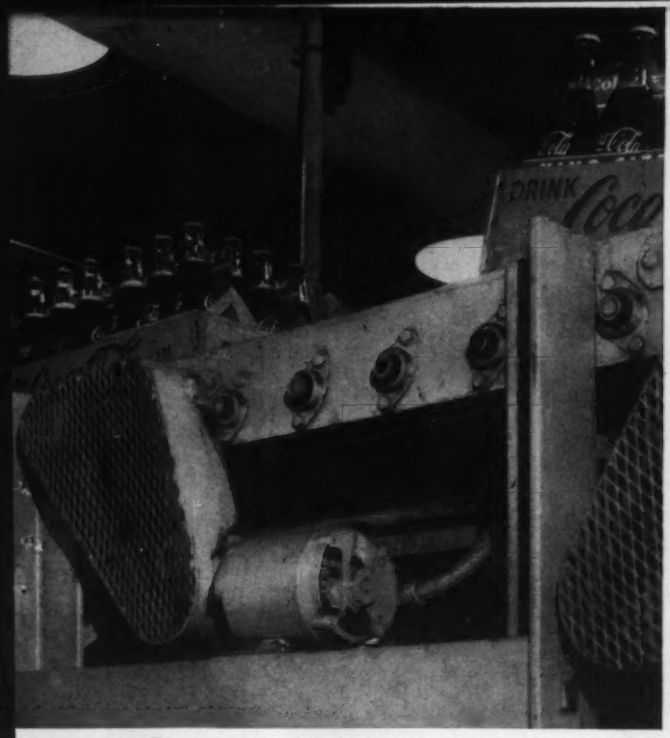
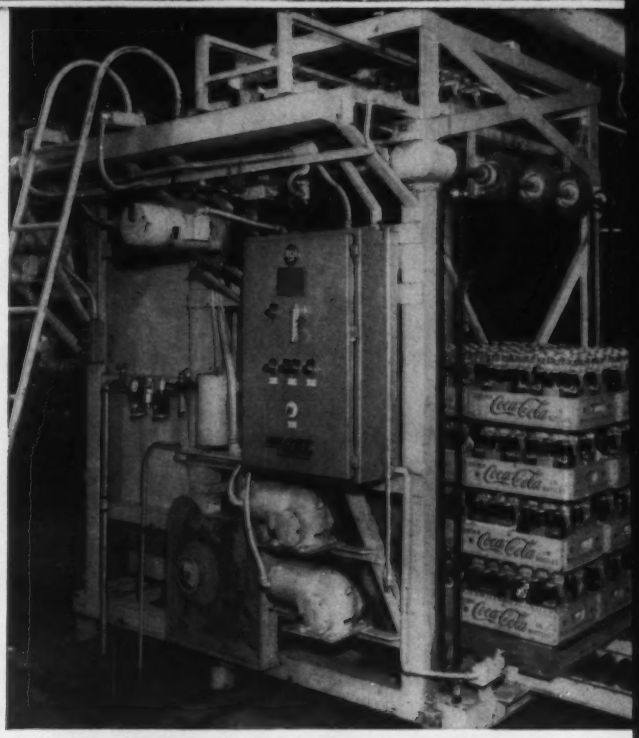


1 Century's compact IR 48-frame gearmotor driving live roll conveyor to the top of pallet loader.



2 A Century 1R64 SC64 gearmotor with brake (in upper left of picture) raises and lowers pallets from empty pallet conveyor to loaded pallet conveyor.

3 Loaded pallets being picked up by lift truck. Century 1R66 SC66, ¾ horsepower gearmotors drive empty and loaded pallet conveyors.

Century gearmotors load, stack and convey thousands of soft drinks per day

Century Electric's single-reduction, right-angle gearmotors are built right into the versatile pallet loader shown here. Thousands of bottles of soft drinks a day are conveyed, stacked, loaded onto pallets and conveyed to fork lift trucks by Century's gearmotors.

Century gearmotors, with silicon bronze worm gears and hardened high-grade steel worms, are designed and built to withstand sudden shocks and overloads in applications such as this pallet loader. Motor shafts are not affected by operational strains because mounting feet are an integral part of the housing (except the IR 48-frame). Also, motor shafts are carried on ball bearings and output shafts run in tapered roller bearings to withstand sudden shocks.

All-angle oiling design assures complete lubrication. Worms or worm gears dip into oil, no matter how the gearmotors are mounted.

The gearhead on the IR 48-frame gearmotor (Picture No. 1) can be assembled in four different positions in relation to the motor, and the motor can be mounted at any angle. The new 1R 48-frame gearmotor is also very compact. With it you can reduce the weight of your product by as much as 20 pounds.

For more information about Century's complete gearmotor line from ⅛ to 125 horsepower, call your nearest Century Sales Office.

CENTURY ELECTRIC COMPANY

St. Louis 3, Missouri *Offices and Stock Points in Principal Cities*

Century

The Superior Quality of PHYSICALS of WASHBURN PHOSPHATE COATED MUSIC WIRE

has amazed Spring Makers on difficult jobs

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CLEAN, UNIFORM BILLETS–STRIP–RECTANGULAR, ROUND, FLAT RODS
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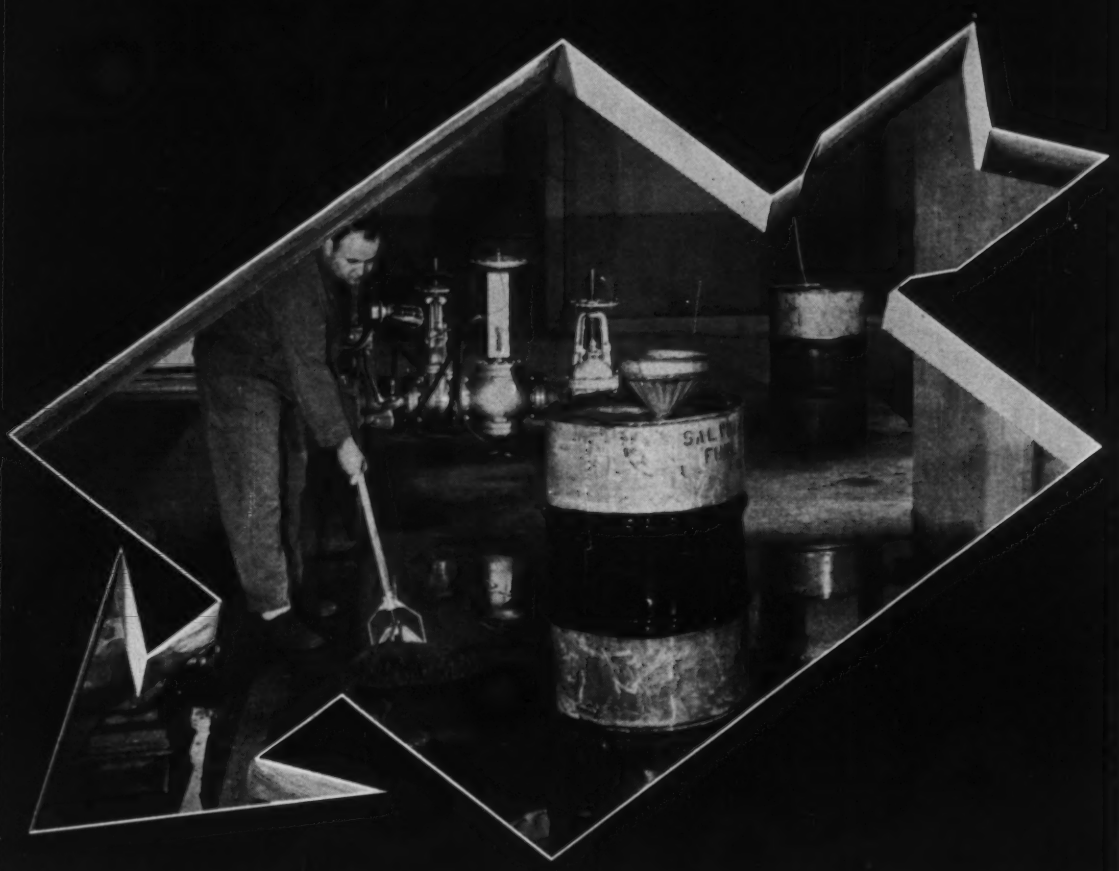

He's mopping up the mess for the last time

At a leading aircraft research center, high-frequency vibration caused severe oil leakage from hydraulic lines servicing a huge wind tunnel. Many man-hours each month were wasted cleaning up the basement floor underneath, even though drip pans were used extensively.

Now, after a change to a Suntac oil, the vibration-caused leakage has been reduced to a point where "mop-up" is not needed. Hydraulic-fluid consumption has been cut by 4000 gallons a year. That's economy! That's Sun quality—the best economy of all.

If your plant is troubled with a leaky system, a Suntac antileak hydraulic oil can save you money, too. Ask your Sun representative to show you the Suntac desk-top demonstration, or write direct to SUN OIL COMPANY, *Philadelphia 3, Pa., Dept. S-3. In Canada: Sun Oil Company Limited, Toronto and Montreal.*

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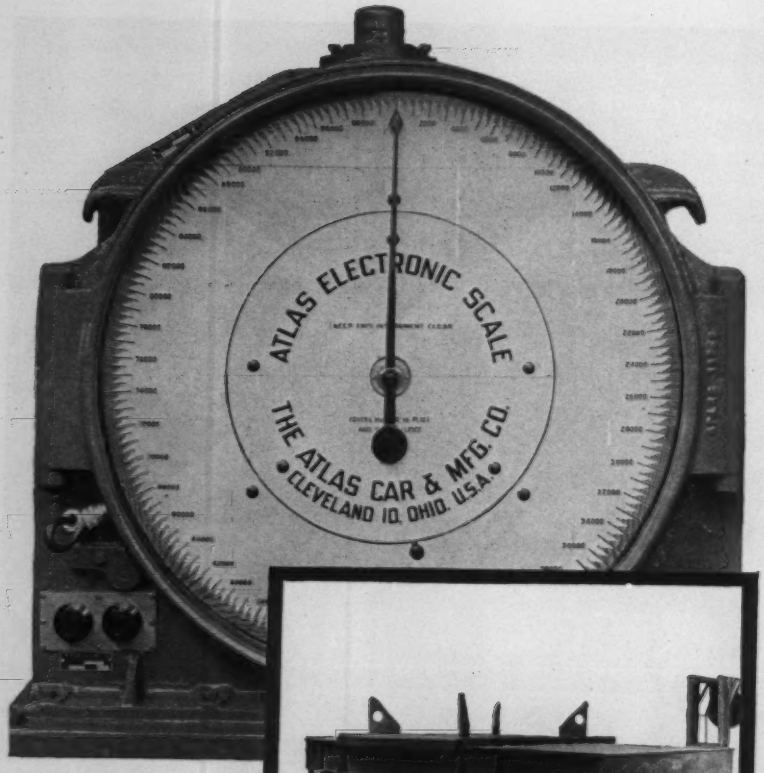

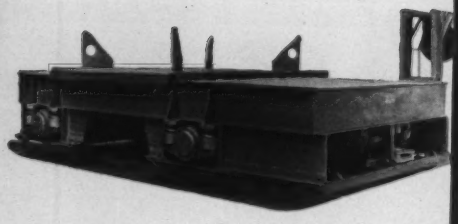

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Atlas Electronic Scales have the accuracy and ruggedness which makes them suitable for the heaviest service. They are credited with being the most simple of any electronic scale on the market.

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CALENDAR
OF MEETINGS

Mar. 21-23, American Society of Mechanical Engineers: American power conference, Sherman Hotel, Chicago. Society's address: 29 W. 39th St. New York 18, N. Y. Secretary: O. B. Schier.

Mar. 22-24, Pressed Metal Institute: Spring technical meeting, Belmont Plaza Hotel, New York. Institute's address: 3673 Lee Rd., Cleveland, Ohio.

Mar. 23-25, American Machine Tool Distributors' Association: Spring meeting, Hotel Mark Hopkins, San Francisco. Association's address: 1500 Massachusetts Ave. N.W., Washington 5, D. C. General manager; James C. Kelley.

Apr. 4-7, Society of Automotive Engineers: National aeronautic meeting and display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: Joseph Gilbert.

Apr. 10-13, American Management Association: National packaging exposition and conference, Lakefront Exposition Hall, Chicago. Association's address: 1515 Broadway, New York 36, N. Y.

Apr. 13-14, American Mining Congress: Radioisotopes conference, Brown Palace Hotel, Denver. Congress' address: Ring Building, Washington 6, D. C.

Apr. 13-15, Metallurgical Society of AIME and the American Society for Metals: Pacific Northwest metals and minerals conference, Davenport Hotel, Spokane, Wash. Society's address: 29 W. 39th St., New York 18, N. Y. Chairman of the conference: W. D. Nesbeitt.

Apr. 15, American Society for Metals: 13th annual spring symposium, Purdue University Memorial Center, West Lafayette, Ind. Society's address: 7301 Euclid Ave., Cleveland 3, Ohio. Chairman of the symposium: T. H. Carlson.

Apr. 17-19, Fifth Conference on Manufacturing Automation: Cosponsored by Purdue University, Manufacturing Engineering Council, *Automation* Magazine. Place: Purdue University, Lafayette, Ind. Information: K. E. Glancy, Division of Adult Education, Purdue University or *Automation*, Penton Bldg., Cleveland 13, Ohio.

Apr. 17-21, American Welding Society: Annual convention and exhibit, Commodore Hotel and Coliseum, New York. Society's address: 33 W. 39th St., New York 18, N. Y. National secretary: Fred L. Plummer.

Apr. 19-20, Foundry Educational Foundation: 14th annual college-industry conference, Hotel Statler-Hilton, Cleveland. Foundation's address: 1138 Terminal Tower Bldg., Cleveland 13, Ohio. Executive director: E. J. Walsh.

PAGE SPECIAL HB
Can Cut Wire Costs Up to 60%

You can use PAGE *Special* HB for many jobs where music wire has always been specified—and save up to 60% on your wire costs! Tensile strengths of *Special* HB, which is available in the size range .020″ diameter to .162″ diameter (bright finish and galvanized), approach those of music wire in all sizes—and in sizes .090″ diameter and coarser equals them! Here are some typical examples:

SIZE	STANDARD HB	SPECIAL HB	MUSIC WIRE
.1620	219,000 min.	249,000 min.	249,000 min.
.1350	227,000 "	258,000 "	258,000 "
.0800	244,000 "	276,000 "	282,000 "
.0200	310,000 "	320,000 "	350,000 "

If you now use music wire, or have been prevented from using it because of its high cost, it makes sense to investigate PAGE *Special* HB.

WHATEVER your wire requirements, you can count on PAGE quality from America's leading special-purpose wire mill. PAGE will give you the tensile strength, ductility, finish, tolerance and other properties you require in a wide range of manufacturers wire items — including corrosion-resistant ACCO *Aluminized* Wire and wires of special shapes.

Write for details. Write us at Monessen, Pa., for Booklet **DH-107a** for the story on PAGE *Special* HB—or for information on other wires.

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PAGE — *the source for answers to wire problems*

The American Hot Dip Galvanizers Association with the cooperation of The American Zinc Institute Announces the $10,000.

Galvanizers' International

Ten Awards of $1,000. Each

Ten awards are to be made to entrants selected by the judges. Each award will consist of $1,000 in cash, a suitable medal and a Certificate of Achievement.

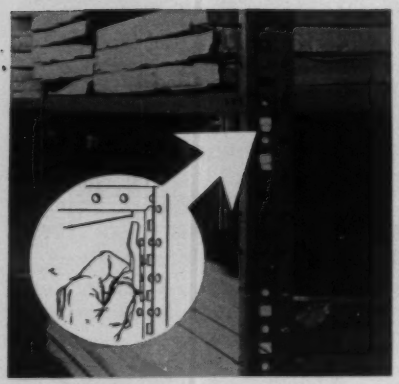
This is not a contest—it is a search for new ideas. ■ *Your entry, therefore,* will not be judged against others, but solely on its merit and value in developing new applications and markets for Hot Dip Galvanizing. ■ If your idea, in the opinion of the judges, is of practical value to the industry, you will be cited for an award—promptly. ■ Because the Hot Dip Galvanizing Industry is anxious to receive ideas of this type, the judges reserve the right to present *more* than 10 awards, if the entries warrant.

CONDITIONS ■ Anyone in the world (except members of the American Hot Dip Galvanizers Association and the American Zinc Institute, and their employees and advertising agencies) may submit one or more entries. ■ Entries will be considered by the judges promptly upon their receipt. No entry received after April 30, 1962 will be considered. ■ The Awards will be made for ideas pertaining to: (a) Applications of Hot Dip Galvanizing to a *new or unusual* field, or; (b) An *improvement* in application in fields where Hot Dip Galvanizing is now being used, or; (c) New methods of *after-treatments* of Hot Dip Galvanized products. ■ Each entry submitted must contain: (a) Description and documentation of application. (b) Case history of the application or process accompanied by photo, drawings, formulae, etc. (c) All technical data needed for the utilization of the idea submitted. (d) Release of the application or idea for general use without payment or royalty other than the $1000 award. ■ The decision of the judges will be final. Award-winning ideas will be retained by the American Hot Dip Galvanizers Association for dissemination throughout industry. Other entries will be returned. ■ No formal entry blank is required but the entry should be accompanied by the name, address and business connection of the individual submitting it. Business firms or corporations may submit entries under their business name, instead of as individuals, if they choose to do so. ■ Entries should be sent to: AMERICAN HOT DIP GALVANIZERS ASSOCIATION, INC., 5225 Manning Place, N.W., Washington 16, D. C. ■ *Note:* For information on galvanizing write to the above address for name and location of the American Hot Dip Galvanizers Association member nearest you.

Awards

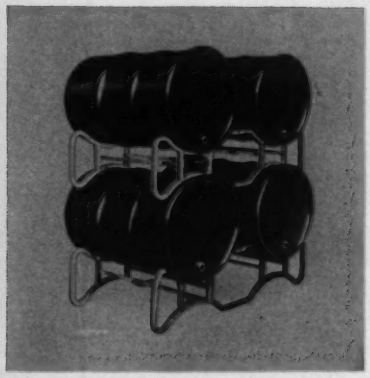
FOR ACHIEVEMENTS IN RESEARCH, DEVELOPMENT AND UTILIZATION OF GALVANIZED PRODUCTS

THE JUDGES ■ Dr. Clarence H. Lorig, Technical Director, Battelle Memorial Institute and Past President American Society for Metals. ■ Mr. John R. Daesen, Technical Director, American Hot Dip Galvanizers Association. ■ Mr. John L. Kimberley, Executive Vice President, American Zinc Institute.



REPUBLIC CLIP SHELVING saves valuable floor space. Complete line, including shelves, parts, accessories, and related items. Every piece Bonderized. Erects fast, easy. No tools required. Adjustable arrangements meet changing shelving needs. The shelf snaps firmly into place. Let your Republic representative storage-engineer your shelving problems. Call, or send coupon today.

REPUBLIC METAL LUMBER provides faster, stronger, safer framing in any application where common building materials are now being used. Simply measure, cut, assemble. Engineered slotted angle pattern speeds erection, reduces time and material costs. Bonderized. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Call or write for attractive brochure.



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RACK, STACK and PACK

Republic Standard Hopper End Boxes

They do it at Flexible Steel Lacing Co.

This manufacturer of belt fasteners for conveyor belting, racks and tilts standard Republic Hopper Boxes at a 45° angle along assembly counters. Parts slide down onto counters as needed.

Now, boxes packed with parts stack four and five high, saving floor space and eliminating clutter prevalent when former wooden boxes on casters were used.

This modern, efficient, small parts handling system is another example of how Republic Material Handling Specialists can adapt economical standard boxes to solve particular problems. This ingenious, money-saving system was engineered by Thornel Associates, Republic's Chicago material handling specialists.

Republic's big line of standard units can provide the basis for the system you need to speed operations, save space, time and money. Call your Republic representative or return coupon below.

Flexible Steel Lacing Company speeded assembly operations and took the stoop out of the job with Republic Corrugated Boxes. Special tilting racks behind work counters were designed to hold boxes at an angle so that parts fall onto the table as needed. Easy to stack and store, Republic Boxes save valuable floor space, too.

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Have Machine Tools Hit Bottom?

"Machine tool orders have probably reached their low point in this recession," says Walter K. Bailey, president, Warner & Swasey Co., Cleveland. The reason for his optimism: "There are indications that inventories of customers have reached the point where their production and their consequent need for machine tools should increase."

Machine Tool Orders Gain and Drop

Net new orders for metal forming machine tools totaled $20.1 million in January, a 55 per cent increase over January, 1960, and a 61 per cent gain over the 1960 monthly average, the Machine Tool Builders' Association reports. However, cutting machine tool orders in January added up to $35 million, 19 per cent below January, 1960, and 16 per cent under the 1960 monthly average. Shipments of cutting machines were $37.2 million, 12 per cent below the 1960 monthly average but 1 per cent above January of last year.

Air Force Given Control of Military Space Projects

In an effort to streamline Pentagon organization, Defense Secretary Robert S. McNamara has made the Air Force responsible for research and development of military satellites, anti-satellite weapons, and space probes. The directive will prevent the Army and Navy from spawning further space projects. However, they will be permitted to conduct limited space research under tight budgetary control.

Exports of Finished Manufactures Hit Record Level

More than half the $19.6 billion in U. S. exports last year was represented by finished manufactures which went up 13 per cent to top out at $10.5 billion, says the Bureau of Foreign Commerce. Boom conditions in Japan and Western Europe caused most of the rise. Dollar import trade liberalization by a number of countries in the last two years also affected the boost. Machinery sales rode a new high at $4.1 billion; semifabricated metals doubled to $1.5 billion; copper exports tripled; and foreign sales of aluminum doubled. Though the U. S. enjoyed an export trade surplus of $4.9 billion last year, unusually large short term capital outflows left the deficit in the over-all U. S. balance of payments at a current estimate of $3.8 billion—about the same as in 1959.

Net Incomes in Metalworking Dropped in '60

Sharp contrasts in business fortunes developed during 1960 in manufacturing, says the First National City Bank of New York. The steel companies had another troublesome year. Though the industry produced 6 per cent more steel than it did in 1959, its profits fell slightly. Seven out of 42

steel firms used red ink; 3 out of 4 had decreases in net income. The aluminum industry saw profits shrink mainly because of weak prices for fabricated items. Copper producers benefited from firmer prices, relative absence of strikes, and active demand from abroad. Here's a preliminary summary of net incomes after taxes:

No. of Companies	Industrial Groups	1959 (In thousands of dollars)	1960 (In thousands of dollars)	Percentage Change
42	Iron & steel . . .	$820,434	$795,287	− 3
110	Electrical equipment, radio & TV	634,366	563,715	−11
135	Machinery . . .	555,320	427,454	−23
33	Nonferrous metals	401,235	388,039	− 3
294	Other metal products	737,431	667,339	−10
48	Autos & parts	1,613,398	1,614,275	+ *
48	Other transportation equipment	175,134	164,793	− 6
1479	†Total manufacturing	$11,686,454	$11,398,892	− 2

*Increase of less than 1 per cent.
†Some categories are omitted in this report.

White House Accelerates Post Office Construction

Authorization for construction of $269 million of postal facilities will come between now and Jan. 1. An announcement from the White House disclosed that originally the outlays were to be spread over the next 18 months. They were speeded up as part of the antirecession program. The spending is in two categories: $100 million will be used to modernize buildings; private capital will account for construction costing $169 million. The facilities will be leased to the Post Office Department.

Public Votes for New Materials in Homes

"The public is hungry for new home building techniques and materials," says John R. McCord, director of marketing, Ferro Corp., Cleveland. "Most new homes are built with the same methods used by our forefathers — meanwhile, costs have skyrocketed." In a survey of 1200 visitors to Ferro's research house last year, more than 70 per cent of the respondents said they would like porcelain enamel on the exteriors and interiors of their next homes. Yet porcelain enamel hasn't been used in new home construction since 1950.

How to Make Instant Mechanical Drawings

SCENE: An engineering drafting room of the future. A design engineer is seated at a desk, dictating specifications into a microphone. Soon, drawings, made automatically, are displayed on a TV monitor on his desk. After the engineer checks the dimensions of the drawings, he pushes a button. Some

distance away, a punched tape instructs a machine tool which proceeds to turn out the part. Time elapsed from concept to finished part: A few minutes. That "dream" is about 90 per cent reality. (See Page 140.)

Hot or Cold—He's Comfortable

Butter quickly melts at 135° F, but the test chamber temperature doesn't affect the comfort of the man in the experimental climatic suit—developed by the Navy and Westinghouse Electric Corp. The temperature outside could be a frigid minus 40° F, and the wearer would still be walking around in a comfortable 80° F environment. An automatic thermoelectric heating and cooling unit is fitted into the back of the suit; the battery pack in front provides power. The suit has no moving parts except for fans to circulate air.

Russian-Chilean Copper Deal Falls Through

The Copper Department of Chile revealed that the Soviet Union declined to make a deal on 10,000 tons of refined copper and 50,000 tons of semifabricated copper. Negotiations (announced in January) were dropped when the Russians said they were not interested in buying the semifabricated material, and the price they offered for raw refined copper was below that prevailing in international markets.

Finding Profits in the Slag Pile

An unusual reduction process is turning out iron from an ore which would otherwise be useless—and the slag is worth about as much as the metal. The starting material, mixed ilmenite and hematite ore, is upgraded in the Humphrey spirals (photo), then charged in reducing furnaces, with iron and slag tapped separately. Most of the iron is recovered as the metal. The slag, containing part of the iron and all the titanium, is sold to producers of titanium pigments and titanium metal. (See Page 123.)

Sales of Structural Steels Show Upswing

Structural steel sales appear to be coming out of their lengthy doldrums, says James M. Straub, president, American Institute of Steel Construction. Industry-wide figures for new orders in January reached more than 272,000 tons, a 22 per cent increase over bookings for December, 1960, and 23 per cent over January a year ago. Mr. Straub reports that: ". . . the upturn is encouraging because the increased bookings reflect numerous small and

STEEL
The Metalworking Weekly

March 13, 1961 Vol. 148 No. 11

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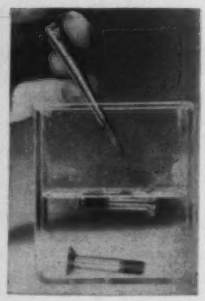
Editorial Index available semiannually.

STEEL also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

medium sized contracts, rather than any two or three huge projects. The rise is in virtually all regions of the country."

Fastener Makers Are Fighting Back



That's a new beryllium bolt, light enough to float, yet stronger than steel pound for pound. Developed by Standard Pressed Steel Co., it's an example of how the fastener industry is using new products to combat the recession, plus foreign and domestic competition — few industries have been buffeted harder by those forces. Other approaches being used to spur business include: Better marketing techniques, a closer look at new materials, the dropping of unprofitable lines, and improvements in methods (See Page 80).

Straws in the Wind

Increased insurance costs were cited as causing United Steelworkers to withdraw from arbitration on a 3 cent cost of living adjustment—a new cost of living determination will be made Oct. 1 . . . The House Commerce Committee approved a 15 month extension (to June 30, 1962) of Interstate Commerce Commission authority to guarantee privately made loans to railroads for capital improvements . . . Prices of silicon rectifiers made by Westinghouse Electric Corp. have been reduced as much as 40 per cent . . . The U. S. Supreme Court has refused to review a lower court order enjoining a group of Philadelphia Teamster officials from using union funds to defend themselves against charges of misusing union funds . . . After the National Aeronautics & Space Administration launches its own satellite for transmitting radio and TV, the agency plans to help private companies put satellites aloft . . . Employment at Kaiser Steel Corp.'s Fontana (Calif.) Works rose to more than 7000 workers in the first week of March—up 400 from September . . . the Federal Communications Commission has proposed that new TV sets be equipped to receive UHF channels 14 through 83 as well as VHF channels . . . U. S. Department of Commerce noted January's $400 million business inventory cut (about the same as December's) was mostly at the retail level while factory stock trimming appeared to be slowing.

Metalworking Pulse

The Business Trend: The 1 point dip in STEEL's industrial production index for the week ended Mar. 4 can be wholly attributed to an auto production slide (Chrysler was completely shut down). **Autos:** Chrysler resumed activity last week, but Ford closed down 11 of its 17 operations, thus minimizing the upturn in output. **Steel:** Ingot production for March is expected to total 7 million tons. That would make it the best of any month since last June.

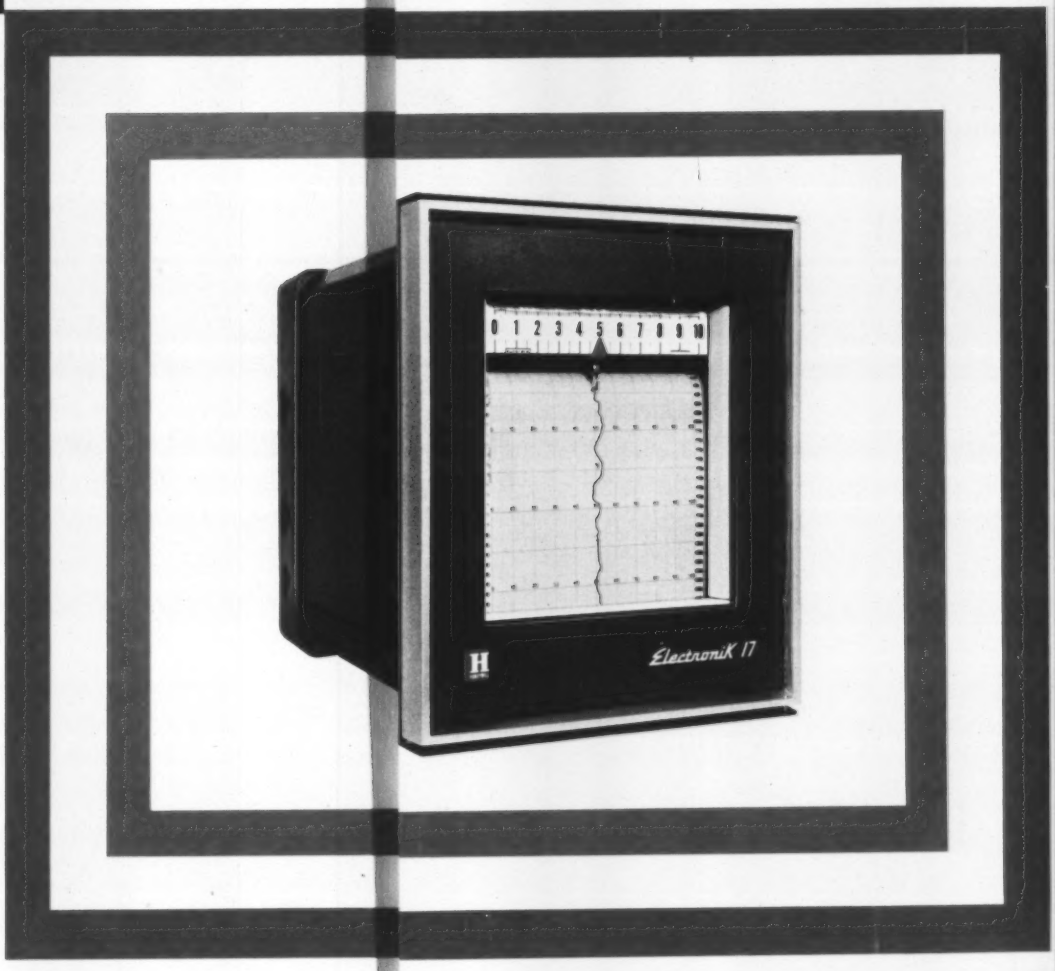
- **INDUSTRIAL PRODUCTION INDEX**
  (1947-49=100)
  Week ended Mar. 4 . . . 146†
  Year ago 177
  Details on Page 97
- **PASSENGER CAR OUTPUT (UNITS)**
  Week ended Mar. 11 98,000*
  Year ago 145,967
  Details on Page 94
- **STEEL INGOT OUTPUT (TONS)**
  Week ended Mar. 11 1,580,000*
  Week ago 1,580,000
  Details on Page 164

†Preliminary. *Estimated.

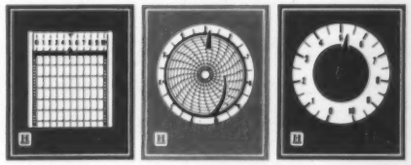
Now you can get . . . revolutionary rebalancing unit . . . modular construction . . . ±0.25% accuracy . . . in a small-case potentiometer . . . the advanced all-new

ElectroniK 17*

HONEYWELL



Now you can get . . . revolutionary rebalancing unit . . . modular construction . . . ±0.25% accuracy . . . in a small-case potentiometer . . . the advanced all-new



The ElectroniK 17* will save you more time, trouble, dollars and maintenance than any other potentiometer on the market today.

HONEYWELL

- New STRANDUCER* replaces slidewire
- New control system with plug-in units
- New modular construction
- New economy

. . . and other pace-setting features.

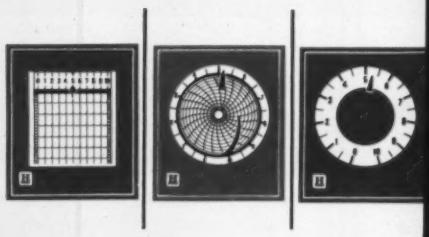
ElectroniK 17 potentiometers are completely new Honeywell recording and control instruments, compact enough to fit standard 19-inch relay racks. They perform reliably, have ±0.25% calibrated accuracy, and incorporate new design advances which make them the easiest of all potentiometers to operate, convert, and maintain.

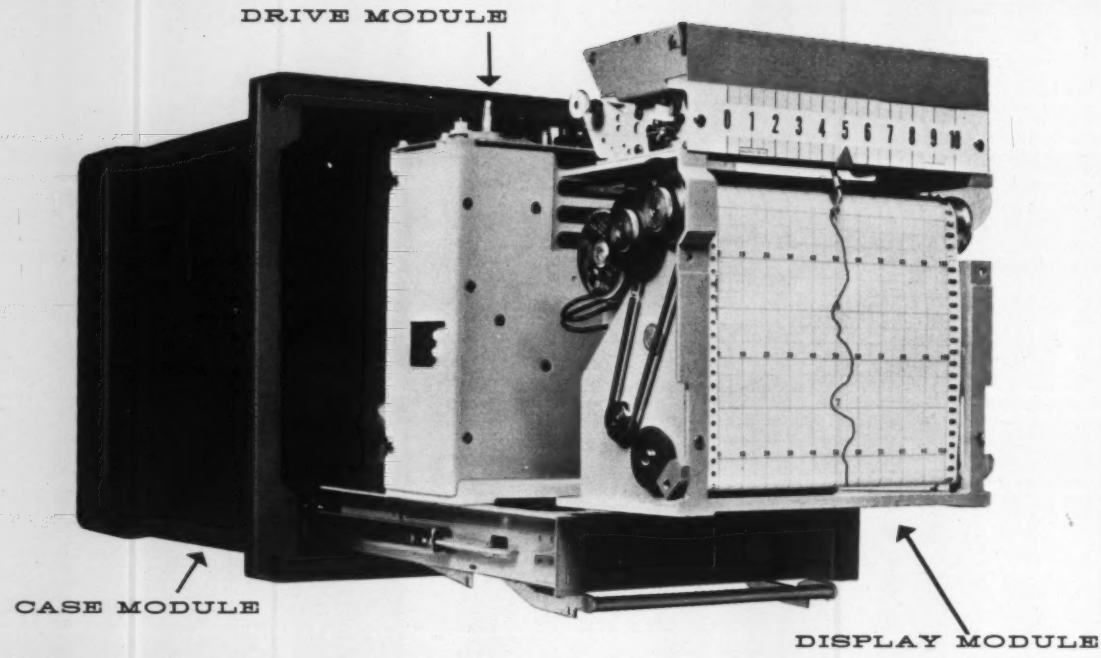
You can get *ElectroniK 17* instruments as strip or circular chart recorders or circular scale indicators. You can get electric contact control with up to 8 contacts. Control units are of plug-in type.

With *ElectroniK 17* potentiometers, you not only get uninterrupted performance, but also save money in initial cost, operating expense, and maintenance. You will find this new potentiometer far more economical to operate than any other available today. The following page will tell you why.

*Trademark

NO SLIDEWIRE, NO SLIDEWIRE PROBLEMS. The unique STRANDUCER rebalancing element, an innovation in potentiometer design, replaces the conventional slidewire. It works on the strain gage principle and consists of four looped wire strands which form the resistance legs of a Wheatstone bridge. Both STRANDUCER and pen carriage are linked to the potentiometer balancing motor. A change in electrical input causes the balancing motor to change the tension—and electrical resistance—of the STRANDUCER. This in turn causes the balancing motor to rebalance the bridge, at the same time repositioning the instrument pen or pointer. The STRANDUCER is unaffected by corrosive atmospheres and has no contactors. It has unusually long life and infinite resolution, and is unaffected when the instrument is subjected to ambient temperatures up to 130°F.





MODULAR CONSTRUCTION. *Modular construction and plug-in components make the ElectroniK 17 the easiest of all potentiometers to operate, convert, and maintain. Component interchangeability cuts service downtime, minimizes spare parts inventory.*

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FRONT ADJUSTMENTS. You adjust damping and gain from the front of the instrument, using only a screwdriver.

QUICK-CHANGE DRIVE GEARS. You can change chart speed to ½ or 2 times basic speed in a matter of seconds by replacing quick-change drive gears. Standard basic chart speeds: 1, 2, 6, 10, or 60 inches per hour.

EASY RANGE AND ACTUATION CHANGE. Simply change range card attached to actuation board. A screwdriver is all you need. Universal reference junction compensator serves *all* types of thermocouples; you can quickly remove it to convert to some actuation other than thermocouple. Filter network rejects loop stray signals.

COMPACT EASILY-REMOVED TRANSISTOR AMPLIFIER. With only a screwdriver you can remove the amplifier for servicing.

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COMPACT CASE SAVES SPACE. With a height of 13¼ in., a width of 11 in. and a depth of 16⅝ in., the *ElectroniK 17* fits a standard 19-inch relay rack. Attach carrying handle to case, and you have a portable instrument. You need no tools to quickly remove door for easy access or conversion from one type of display module to another.

TERMINAL BOARD AND PULL-OUT CHASSIS You can pull out the chassis to the service position without tools and without interrupting the operation of the instrument, or completely remove it. Flexible wiring drawbridge keeps instrument operating when chassis is pulled out to service position, unplugs for removal of components. All external wiring connections go to terminal board at back of instrument case.

For complete information on the *ElectroniK 17*, call your nearby Honeywell field engineer or write to MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.—In Canada, Honeywell Controls Ltd., Toronto 17, Ontario.

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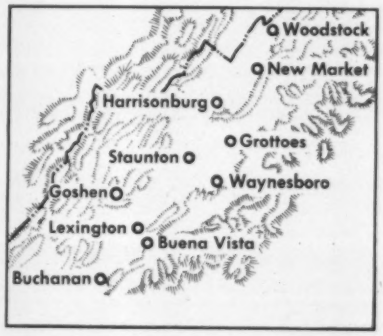

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Just scrape and wirebrush to remove rust scale and loose rust—then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust. Its **specially-processed** fish oil vehicle penetrates rust to bare metal as proved in radioactive tracing studies. You save time and money, as costly surface preparations are usually reduced.

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but only **one** Rust-Oleum.
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- ☐ FREE TEST SAMPLE of Rust-Oleum 769 Damp-Proof Red Primer.
- ☐ Please have your representative contact us to discuss a plant survey.

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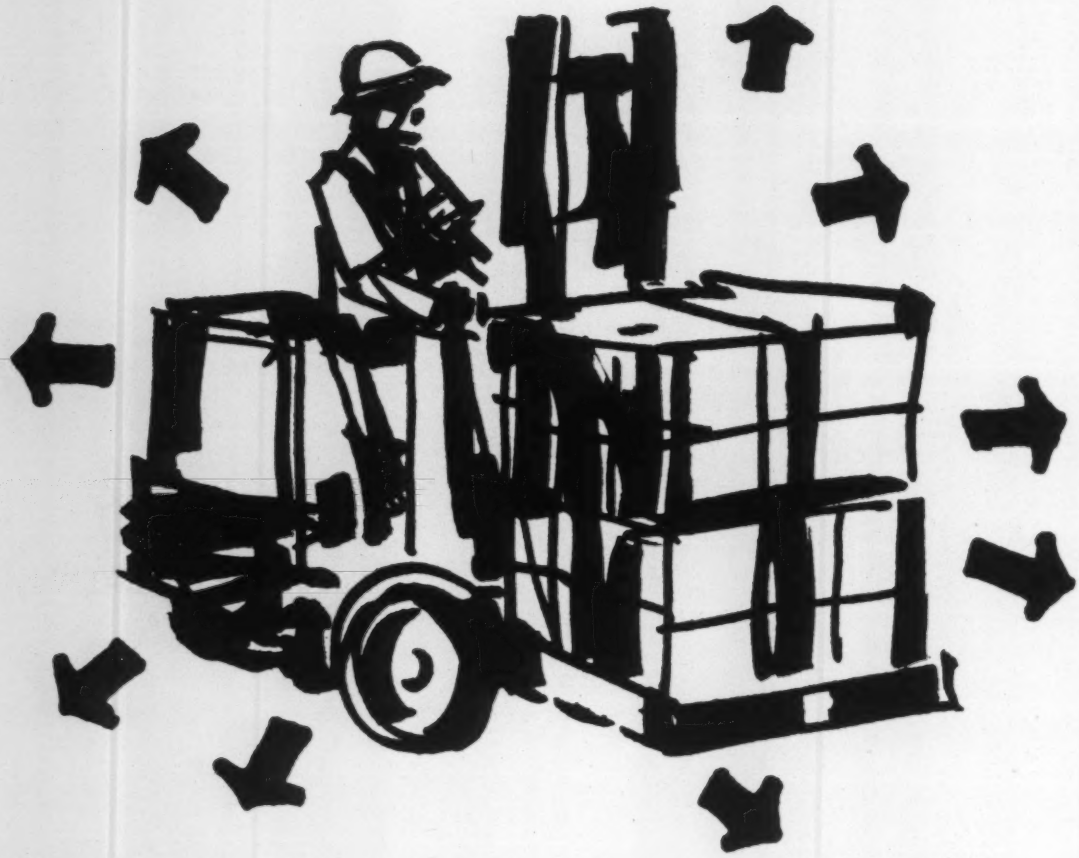

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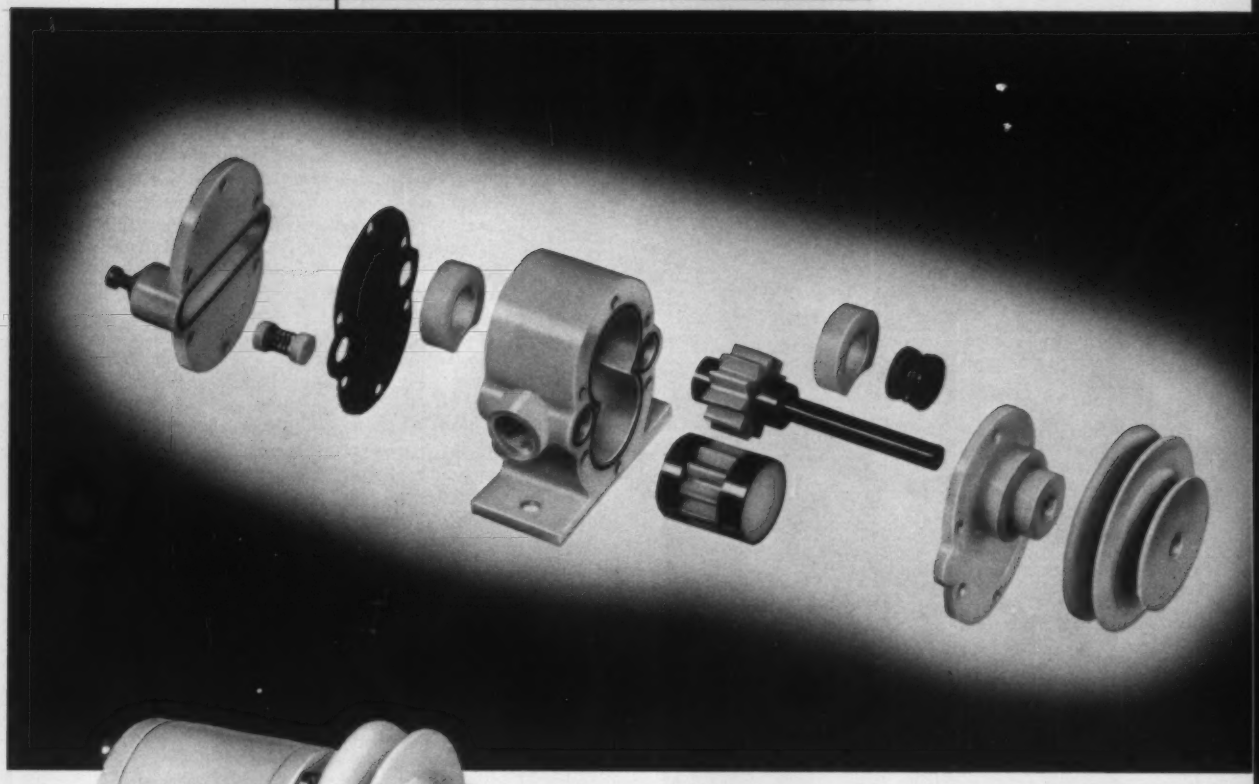
one of Du Pont's versatile engineering materials



Pump parts of DELRIN® cut costs...reduce horsepower requirements

Here is a new gear pump that attains the maximum advantages of its patented design features by using Du Pont DELRIN acetal resin for all the major parts (housing, gears, bearings, cover plates, bypass valve and drive sheave). Compared with rotary pumps now made in brass and other metals, the new pump of DELRIN has better efficiency, less heat buildup, improved bearing characteristics with no lubrication, quieter operation and longer life. The manufacturer reports that the low friction of DELRIN reduces horsepower requirements as much as 50% over comparable models in brass.

In addition, economical injection molding of these parts to close tolerances—plus the elimination of expensive finishing operations—provides the greatest possible savings in pump cost. The pump parts are molded by Artag Plastics Corporation and Chicago Molded Products for Planet Products of Chicago, Illinois.

As in most applications, it is a *combination* of property advantages that makes DELRIN outstanding in performance. The different parts of the pump depend, in varying degrees, on such properties of DELRIN as: high strength, stiffness, creep resistance, corrosion resistance, non-lubricated bearing characteristics, low friction, dimensional stability, abrasion resistance and excellent fatigue life while subjected to a range of temperatures and environments.

On the following page, you'll find more examples of how these properties are being used to improve the performance and lower the production costs of a variety of pumps. The details may well stimulate your thinking about the advantages of DELRIN for *your* products.

DU PONT

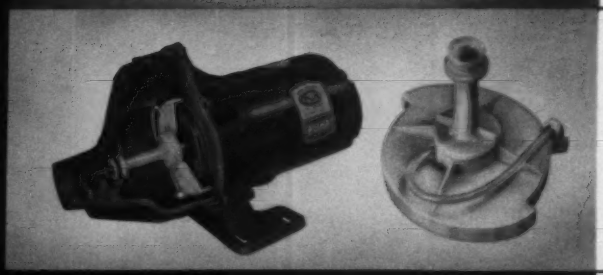
REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

Delrin® *one of Du Pont's versatile engineering materials*

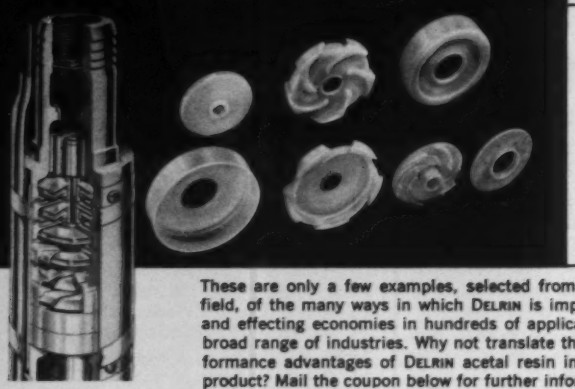
How parts of DELRIN® improve pump performance

WALKER lubricator uses DELRIN for the pumping unit of a new improved central lubricator for vehicles. Here the high temperature strength of DELRIN is a prime requirement—the pump body must withstand under-the-hood temperatures up to 250°F. Pump body, cap, check valve and tube connector are all economically injection-molded of DELRIN. They meet the exacting mechanical requirements for the pump in addition to providing major savings in manufacturing costs. (Molded by G. Felsenthal and Sons, Chicago, Illinois, for Walker Manufacturing Co., Racine, Wisconsin.)



CLAYTON MARK jet pump has an improved volute housing and venturi assembly of DELRIN, replacing the former combination of cast iron and brass, and offers significant advantages in both cost and pumping efficiency. Creep resistance, abrasion resistance and dimensional stability, even under elevated temperatures, are necessary here. The two parts of DELRIN are easily and economically joined by spin welding. (Molded by Chicago Molded Products, Chicago, Illinois, for Clayton Mark Company, Evanston, Illinois.)

RED JACKET "Trailblazer" jet pump uses new injection-molded impellers of DELRIN, because these parts give superior performance over comparable models in brass through increased efficiency, greater abrasion resistance, reduced mineral buildup and longer life. In addition, the use of DELRIN resulted in a 35% saving in impeller costs. (Molded by Chicago Molded Products, Chicago, Illinois, for Red Jacket Manufacturing Company, Davenport, Iowa.)



RED JACKET "Custom Submerga", a new submersible pump, uses DELRIN to achieve new high standards of performance and dependability. In each of the stages, DELRIN replaces brass for the impeller, bowl and diffuser. The fatigue endurance, strength and resistance to creep and corrosion of DELRIN are particularly valuable. According to the manufacturer, precision-molded parts of DELRIN provide an 85-90% cost saving over comparable parts in brass.

These are only a few examples, selected from one particular field, of the many ways in which DELRIN is improving designs and effecting economies in hundreds of applications across a broad range of industries. Why not translate the cost and performance advantages of DELRIN acetal resin in terms of your product? Mail the coupon below for further information.

POLYCHEMICALS DEPARTMENT

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

E. I. du Pont de Nemours & Co. (Inc.), Dept. B
Room 2507 Nemours Building, Wilmington 98, Delaware
I am interested in evaluating DELRIN for the following use:

_____

*Name*_____

*Company*_____ *Position*_____

*Street*_____

*City*_____ *Zone*_____ *State*_____

In Canada: Du Pont of Canada Limited, P. O. Box 660, Montreal, Quebec.

DELRIN® *acetal resins*

Alathon® · Zytel® · Lucite®

The nearsighted MISTER MAGOO says . . . "1956? A banner year! Princess Grace was married—unfortunately I couldn't attend—and General Electric invented the Power Groove Lamp. Happy birthday, Power Groo—Bowser! drop that salami! You've taken enough bites out of it already!"

© UPA PICTURES, INC.

G-EXCLUSIVE! Power Groove® cuts your initial costs as much as 40¢ a sq. ft.

General Electric Power Groove Lamps start saving you money the day you specify them.

By any standard of comparison, they give you more light—with fewer lamps—than any other fluorescent type or brand. If you're building or remodeling, Power Groove Lamps *can save you up to 40¢ per square foot of lighted floor area* right off the bat.

Just the beginning. With fewer lamps, fixtures and ballasts overhead, your maintenance men spend less time on ladders.

Your employees' increased efficiency helps pay for Power Groove Lamps. If every reject makes you wince, consider how improved lighting—at no extra cost—might spruce up your operation. Perhaps you can remove the individual lamps that light only machines or tables.

General Electric's 5-year-old secret is in the grooves. They bend a 9-ft. arc stream through an 8-ft. tube and swing it closer to the light-producing phosphor coating. No other fluorescent lamp compares with the Power Groove. Call your General Electric Lamp distributor when *you* need lamps. General Electric Co., Large Lamp Dept. C-14, Nela Park, Cleveland 12, O.

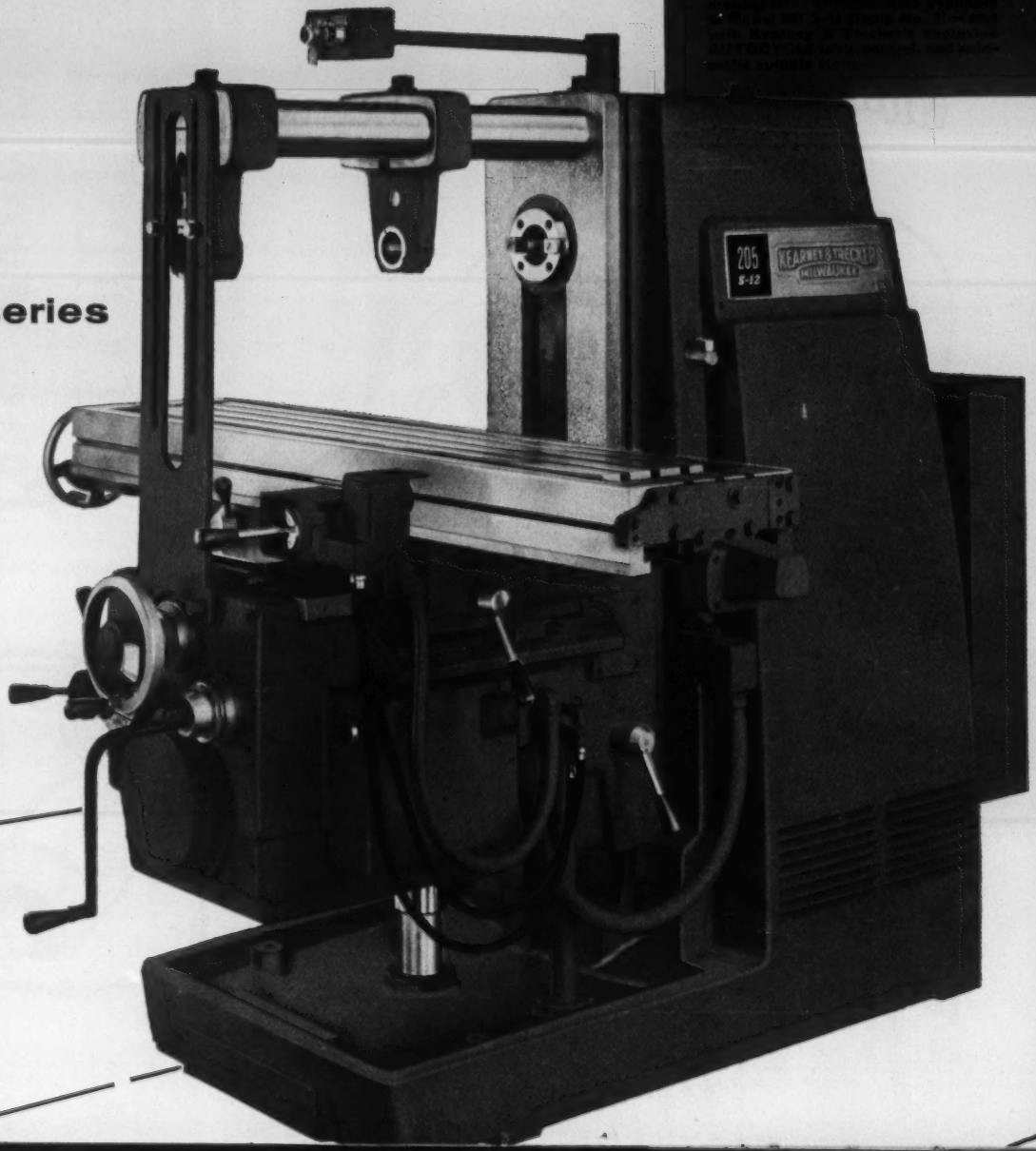
Progress Is Our Most Important Product

GENERAL ELECTRIC

MORE PARTS FASTER with the NEW S-12 series

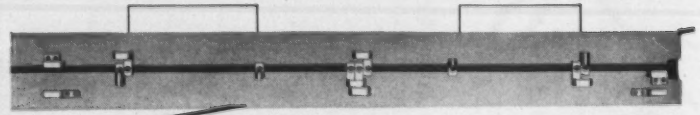
knee type milling machines

New Model 205 S-12
(5hp No. 2)



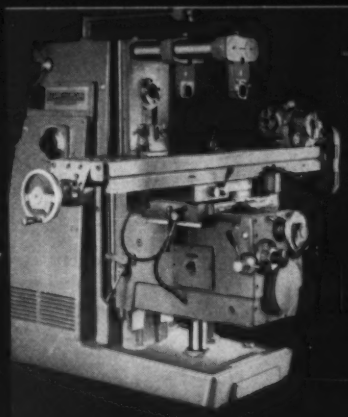
Unquestionably your first impression of the clean, functional styling of these all-new "*S-12's*" will be an immediate feeling of modern precision, strength, stability, and careful, thorough engineering. BUT — there's a lot more to these all-new "*S-12's*" than first meets the eye! There are time-saving, production-boosting features incorporated in this all-new "*S-12 Series*" that make it worthy of your most serious *Consideration and Comparison* if you have any thought of modernizing your plant facilities to increase productivity.

Here are but a few of the new "S-12 Series" features that can help you make more parts — faster.

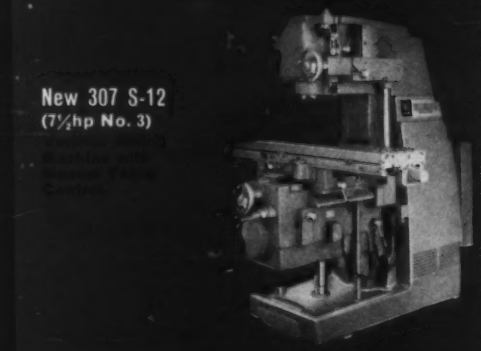


SIMPLIFIED TRIP DOGS . . .

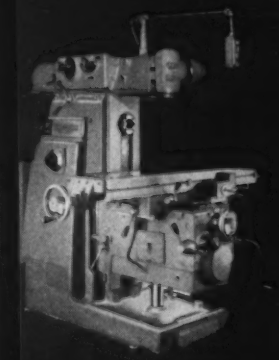
COMPARE K&T's exclusive **AUTOCYCLE Control** for production milling with knee type flexibility and versatility . . . more parts faster with less effort, because idle time is automatically converted to cutting time. Four types of trip dogs — Feed, Rapid, Reverse, and Stop — mounted in a single slot on the front of the table, control a basic reciprocal automatic cycle. Automatic cycles can be to left and/or right for either conventional or climb milling . . . permit utilization of full table travel.



New 307 S-12
(7½hp No. 3)

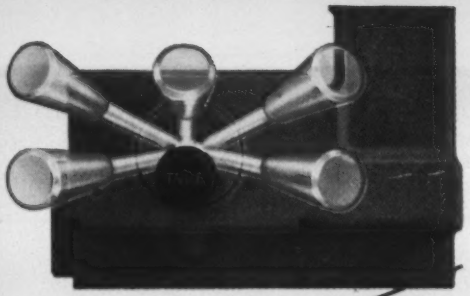


New 307 S-12
(7½hp No. 3)



New 307 S-12
(7½hp No. 3)

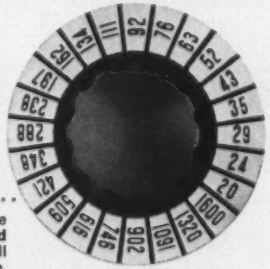
Available on
TOOL LEASE
Minimum Capital Investment
Your Choice of 3 Plans

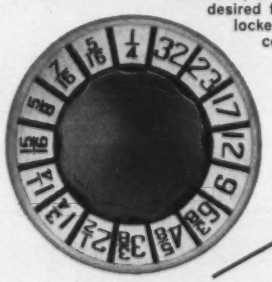


SINGLE LEVER CONTROL . . .
COMPARE this new concept in single-lever control, the **MONO-LEVER,** a Kearney & Trecker "First" in the industry. On all **AUTO-CYCLE "S-12's,"** this single, six-position lever controls table feed, rapid traverse, AND rapid traverse movements of saddle, knee, and vertical head . . . is used for both manual or **AUTOCYCLE** control with equal advantage.

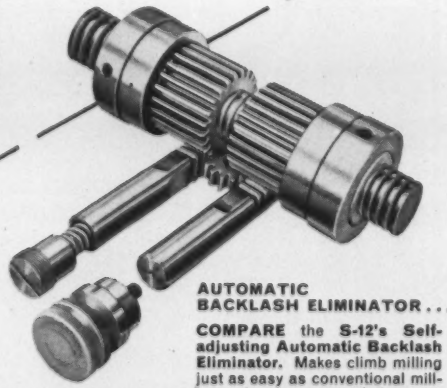
POWER ASSIST FEED CHANGE . . .
COMPARE the speed and ease of the **S-12 Feed Rate Change . . . a** simple pull and turn with these large, easy-to-read Feed Range Dials through the shortest arc in either direction, and the **S-12** is set to the desired feed rate. Changes are locked in without over-ride or coasting — change gears are hydraulically shifted and held.

QUICK-SET DIALS . . .
COMPARE this **S-12** time-saver, **Rapid-Set Micrometer Dials.** Non-glare finish for easy reading . . . spring-loaded. Merely pull out and rotate to desired setting, and release for quick, positive-lock settings . . . graduated in .001" increments. Handwheels and handcranks do NOT spin during power feeds or rapid traverse.





POWER ASSIST SPEED CHANGE . . .
COMPARE the ease of the **S-12 Speed Change.** Just a pull and turn of this large, easy-to-read dial through the shortest arc in either direction to select any of 24 speeds from 20 to 1600 RPM on the **205 S-12's.** 24 speeds, from 30 to 2400 RPM on the **307 S-12's.** Speed changes are locked in without over-ride or coasting. Shifting is smooth and quiet. Safety interlock prevents change being made during a cut.



AUTOMATIC BACKLASH ELIMINATOR . . .
COMPARE the **S-12's Self-adjusting Automatic Backlash Eliminator.** Makes climb milling just as easy as conventional milling. A mere twist of the wrist sets it for instant use in reciprocal milling cycles.

This is but a brief look, a mere smattering of the outstanding features incorporated in these all-new *S-12 Series* machines. They're literally new from top to bottom, inside and out, for truly modern cost-saving, maintenance-saving, fast, accurate, profit-producing operation.

All we ask is that you Consider and Compare these all-new Kearney & Trecker S-12 Series Milling Machines. Discover for yourself that there are none newer . . . none finer . . . none better suited for increasing productivity.

To assist you, the facts for your *Consideration and Comparison* — Bulletin No. S-60, and RS-60 will be mailed promptly upon request.

Standard Machinery Division

KEARNEY & TRECKER CORP.
6800 W. NATIONAL AVE., MILWAUKEE 14, WIS.
(or phone GReenfield 6-8300 . . . direct Distance Dialing Code No. 414)

KEARNEY & TRECKER
MILWAUKEE

WORLD'S RECORD

IN BASIC OXYGEN STEELMAKING ESTABLISHED BY HARBISON-WALKER LINING

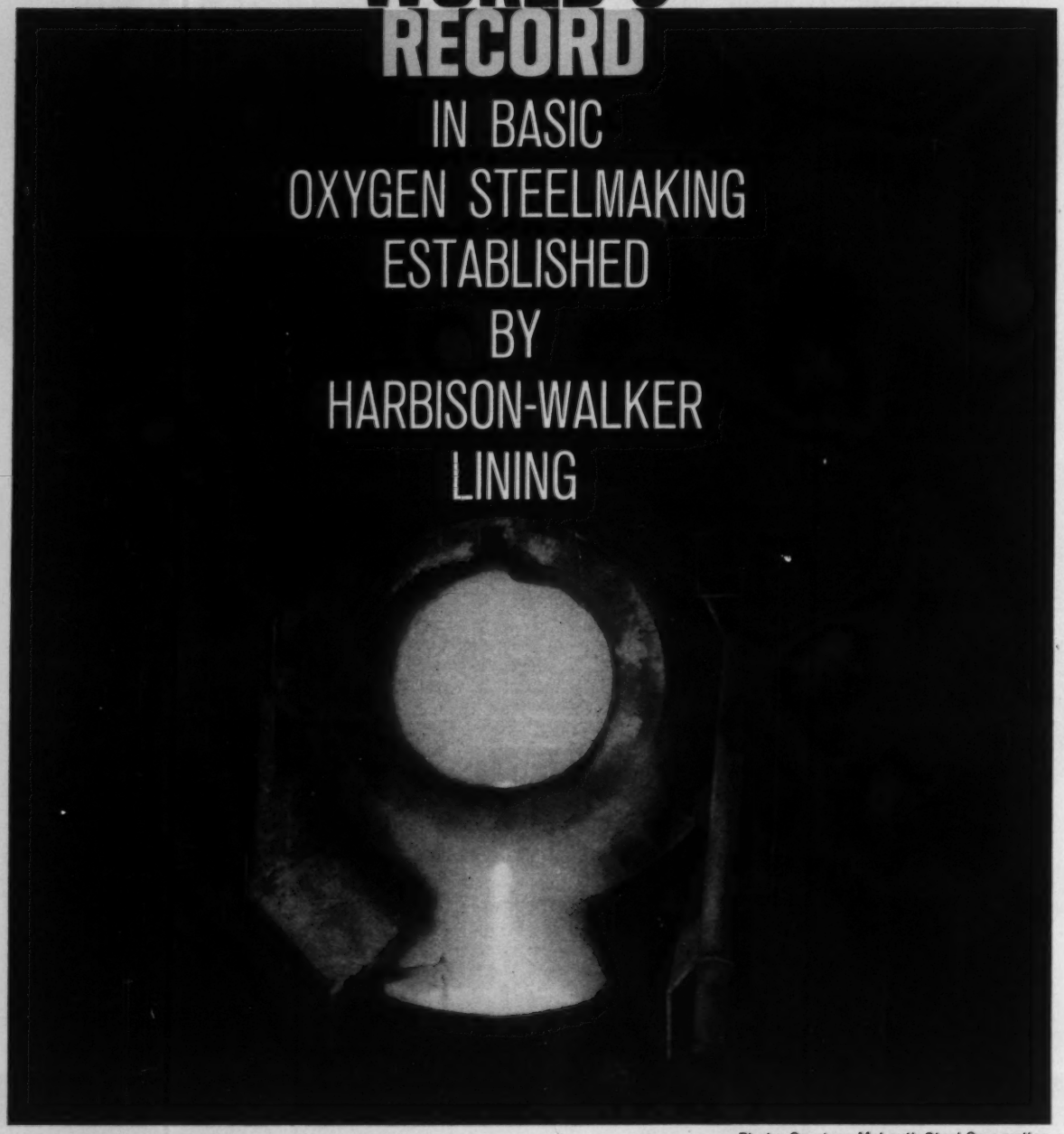


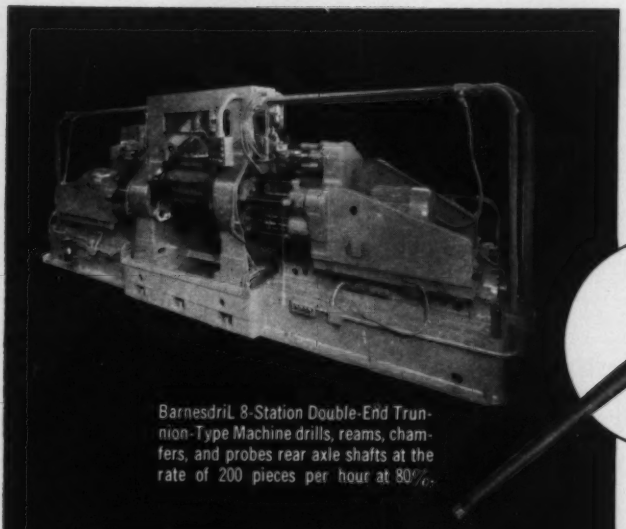
Photo: Courtesy McLouth Steel Corporation

A record number of tons of steel produced during a single furnace campaign has been achieved on a Harbison-Walker OXILINE H basic oxygen furnace lining. The campaign of 292 heats with negligible maintenance produced 31,405.05 net tons of steel.

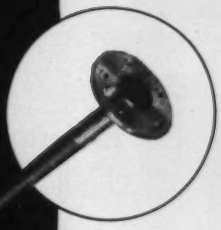
Harbison-Walker produced the first tar-bonded basic brick in the United States . . . has been the leader in the field since the introduction of the basic oxygen process in this country . . . has developed and supplied linings for all furnaces in existence on the North American continent. In fact, more tons of steel have been produced on H-W OXILINE linings than on all other brands combined. HW 61-5

HARBISON-WALKER REFRACTORIES CO. & SUBSIDIARIES
GENERAL OFFICES: PITTSBURGH 22, PA.
World's Most Complete Refractories Service

AGAIN...and AGAIN...and AGAIN BARNESDRIL ENGINEERS MEET THE CHALLENGE...

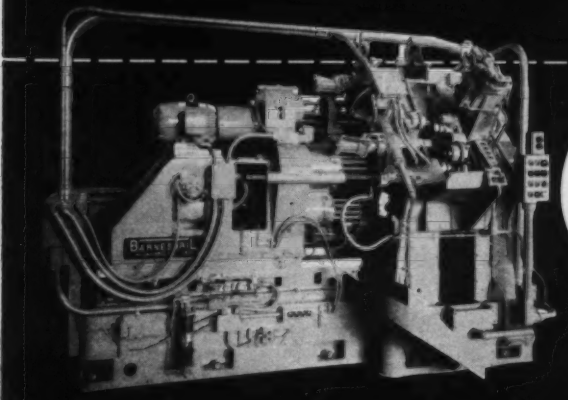


BarnesdriL 8-Station Double-End Trunnion-Type Machine drills, reams, chamfers, and probes rear axle shafts at the rate of 200 pieces per hour at 80%.

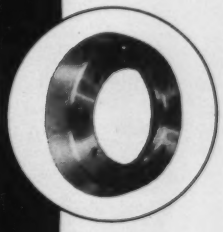


...TO SPEED PRODUCTION OF REAR AXLE SHAFTS

BarnesdriL's design improvement program led to the development of this 8-Station Trunnion-Type Machine. It produces as many rear axle shafts in one 8-hour shift as an older style Rotary Index Machine did in five 8-hour shifts.

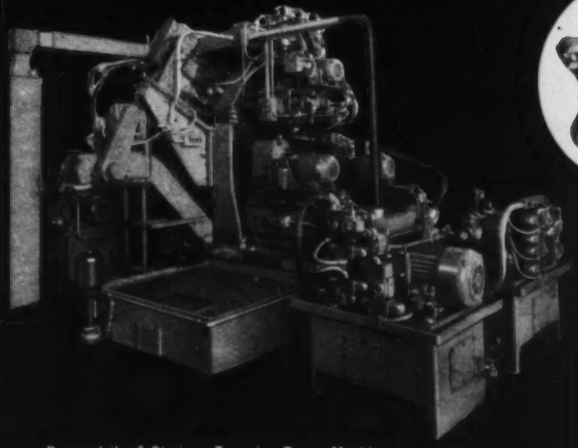


Special 8-Station Drum-Type Machine designed and built by Barnes Drill Co. for drilling, reaming, chamfering, tapping, and probing rear axle drive gears at 200 parts per hour at 80%.



...TO CUT COSTS ON REAR AXLE RING GEARS

This Drum-Type machine is a recent BarnesdriL engineering achievement to substantially increase production of ring gears for a large automobile company. Equally as important as increased production speed is the extreme tolerance accuracy and precision machining incorporated in this unit.



BarnesdriL 6-Station Trunnion-Type Machine performs drilling, threading spindle end, reaming, milling keyway, spot-facing, and probe operations on automotive steering knuckles at 208 pieces per hour at 80%.

...TO IMPROVE OUTPUT ON STEERING KNUCKLES

Another BarnesdriL Trunnion-Type Machine — a 6-Station Unit for machining steering knuckles. Application of a horizontal-type machine achieved more effective chip disposal, increased power through heavier construction, and higher speeds and feeds.

BarnesdriL's experience in designing and building special machinery is at your disposal.

Honing Machines/Production Units
Filtration Units/Drilling Machines

BARNESDRIL
PRODUCTION UNITS

BARNES DRILL CO.

854 CHESTNUT STREET • ROCKFORD, ILLINOIS
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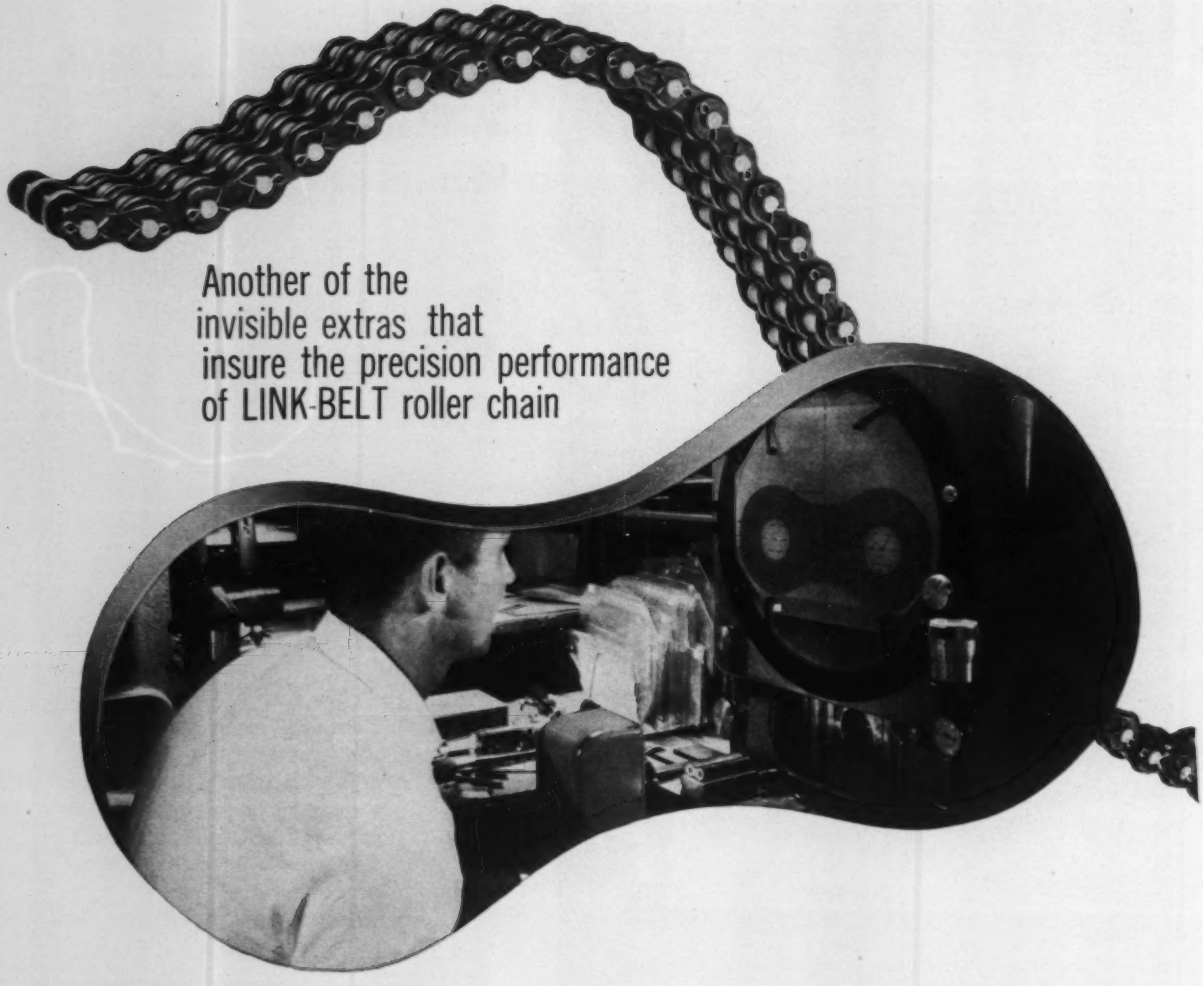

Another of the
invisible extras that
insure the precision performance
of LINK-BELT roller chain

Optical comparator inspection guarantees

precision of every part

Precision is *rigidly practiced* in every step of Link-Belt's roller chain production. The optical comparator is an example of the specialized equipment used to assure precise manufacturing control of chain parts and tools. It is capable of magnification up to 100 times.

Continuous inspection is just one of the *invisible extras* that contribute to the greater strength and endurance of Link-Belt roller chain. Others include precise heat-treat control, prestressing, pitch-hole preparation, shot-peening and burnishing of rollers.

Double- and triple-strand LINK-BELT steel roller chains easily handle the heavy loads encountered by this storage table drive.

These features—plus painstaking precision in every step of manufacture—assure you of chain that can easily cope with today's heavy loads and high drive speeds.

For engineering assistance in applying industry's preferred roller chain, contact your nearest Link-Belt office or authorized stock-carrying distributor. See CHAINS in the yellow pages of your phone directory.

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7;

LINK-BELT

ROLLER CHAINS AND SPROCKETS

Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs; Switzerland, Geneva. Representatives Throughout the World. 15,597

Peter A. FRASSE & Co. Inc.
ANALYSIS AND TESTS CERTIFICATE

FRASSE

"CONTROLLED QUALITY" STEEL BARS

PREDICT PERFORMANCE with ...

"Controlled Quality" is the valuable extra you get in every bar of carbon and alloy steel shipped by Frasse. It results from rigid inspection practices through every step of production . . . tight adherence to "specs" . . . and careful handling, storing and shipping methods to protect straightness and surface finish.

The advantages of Frasse "Controlled Quality" are yours—in uniform results from bar to bar . . . shipment after shipment. It assures predictable performance from the steel you use . . . before you use it. You get exactly what you pay for, every time.

Since 1816—when Frasse first began serving steel users, its reputation for product reliability has been unsurpassed. That's why Frasse is a leading source for carbon bars and shafting—as well as commercial and aircraft quality alloy steels.

Frasse stocks an unusually complete range of sizes and grades—quick deliveries are routine. If you insist on top quality—want it fast . . . make it a point to call Frasse. Thousands of leading firms do . . . to their complete satisfaction.

Call FRASSE 1st for Carbon and Alloy Steels

Frasse Stocks Include:

C1018	C1141	E4130
C1045	C1212	4130 H.T.
B1112	C1213	4140
B1113	Ledloy	4142
B1113X	4615	4142 H.T.
C1117	8620	E4340
C1137	E9310	E8740

STEEL SERVICE CENTER INSTITUTE

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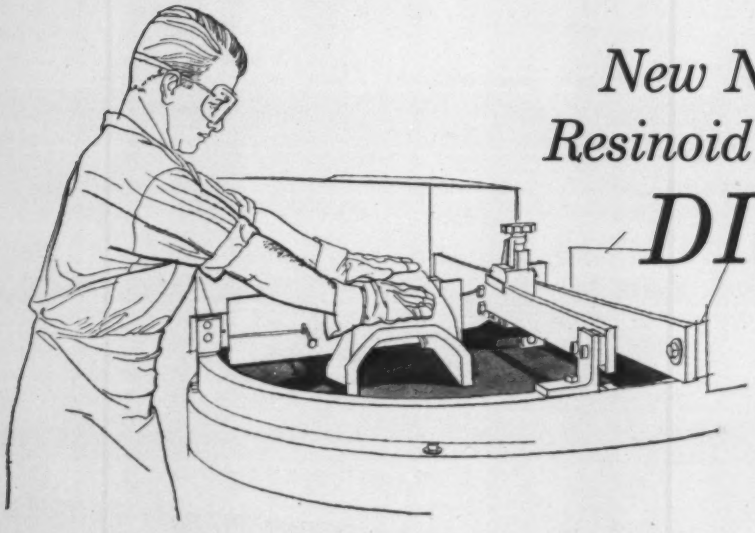
Profit by the big advantage plant after plant is already using . . .

Hit that new high in

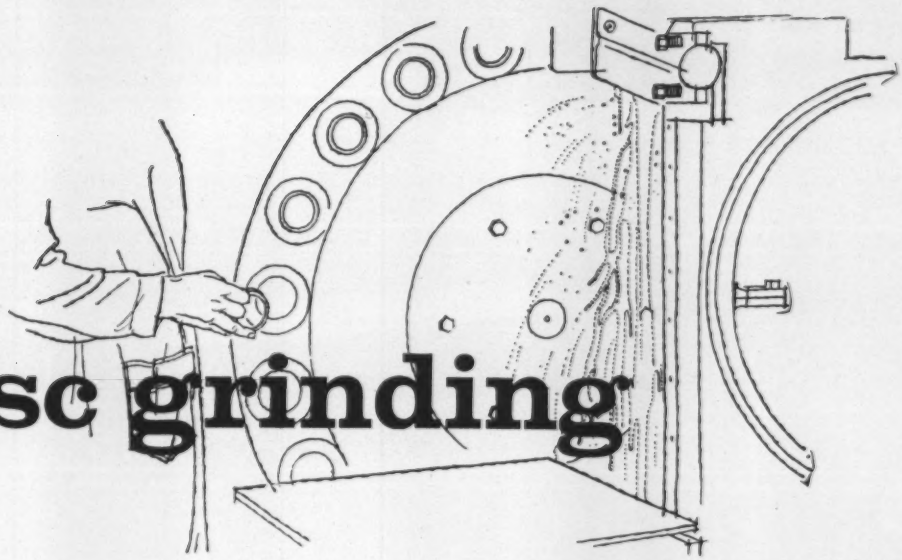
with

B14



New Norton Resinoid Bonded

DISCS



disc grinding

Throughout the country plant after plant is showing real enthusiasm for the new economy — and profits — the Norton-developed B14 resinoid bond has brought to the finest disc wheels ever made.

Development of the new B14 bond involved not only improvements in bond material but entirely new processing.

It took several years to perfect these changes. It also took many months to complete nation-wide testing of the new B14 discs, on all types of disc grinders — horizontal or vertical spindle, single or double — on jobs ranging from snagging to precision finishing, and on ferrous, non-ferrous and non-metallic materials. Also, the tests were entirely comparative — not only against competitive wheels but against Norton discs which were then standard.

Results of this across-the-board testing are outstanding. The new B14 discs have proved beyond question their ability to grind more workpieces per disc . . . faster and better, with fewer dressings . . . and with constant uniformity throughout extra long disc life.

Let new B14 discs bring you proof of better lower cost surfacing. Have your Norton Man, a trained abrasive specialist, study your requirements and make trial runs of the B14's you need — solid discs or segmental, ALUNDUM* or CRYSTOLON* abrasive. Or get details from your Norton Distributor. NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors around the world.

*Trade-Marks Reg. U.S. Pat. Off. and Foreign Countries

A few of very many reports from Norton customers . . .
PROVING B14 DISCS THE BEST

JOB: Rough grinding iron castings, 3½" x 2½",

REPORT: **B14 37 CRYSTOLON wheel ground 6,000 parts with one dressing. Best previous disc gave 4,500 parts with 4 dressings.**

JOB: Surfacing cold rolled steel washers on double disc machine.

REPORT: **B14 19 ALUNDUM discs impressive as best so far, with very even wear.**

JOB: Through-feed grinding of 52,100 steel bearing races.

REPORT: **B14 ALUNDUM disc very free cutting, clean and cool. Longer life than previously used Norton disc.**

JOB: Double-disc grinding Alnico magnets.

REPORT: **B14 mixed-abrasive wheel thoroughly approved for new orders.**

JOB: Double-disc grinding abrasive sticks.

REPORT: **B14 37 CRYSTOLON disc gave improved rate of cut. More abrasive sticks per disc-dressing.**

JOB: Rough grinding miscellaneous parts on double end machine.

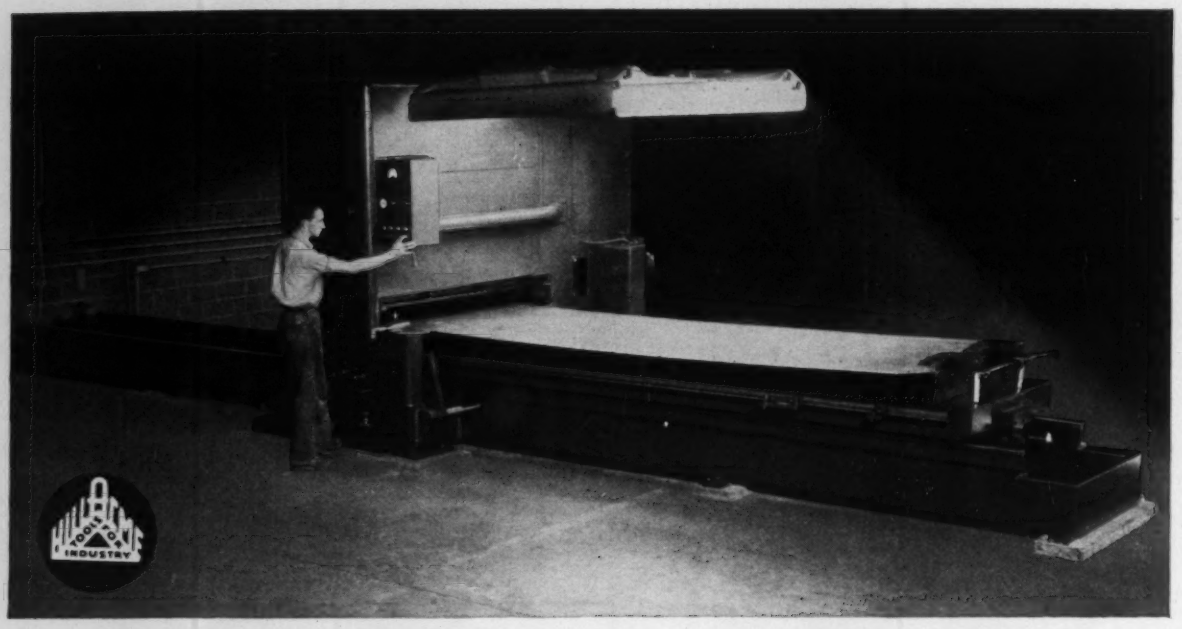
REPORT: **B14 44 ALUNDUM disc performed better, lasted longer than all types.**

NORTON
ABRASIVES

W-2009

Making better products . . . to make your products better

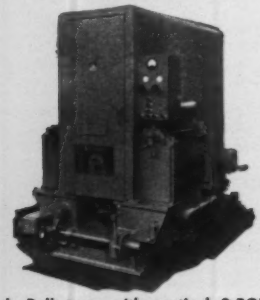
NORTON PRODUCTS: Abrasives • Grinding Wheels • Machine Tools • Refractories • Non-Slip Floors — BEHR-MANNING DIVISION: Coated Abrasives • Sharpening Stones • Pressure-Sensitive Tapes



HILL Sheet and Plate polishing machine with reciprocating table and vertical 2-ROLL head.

With YOUR OWN HILL Abrasive Belt Grinding and Polishing Machine you can:

Vertical 2-ROLL HEAD. Two rolls, accurately controlled for speeds and pressures with easy adjustment for proper tension of the endless abrasive belt. A variety of grits are available.



HILL Pinch Roll type with vertical 2-ROLL head for polishing strip or single pieces. Can be used singly or in multiple units for line production.

1. Prepare the precise finish best suited to your needs.

2. Insure close inventory control of finished material.

3. Save up to half the cost of buying prepolished sheet and plate.

Increasing volume production points up the advantages of a HILL Grinding & Polishing machine in your own plant. No delay in deliveries — No premiums paid to outside sources for material that ALMOST meets requirements.

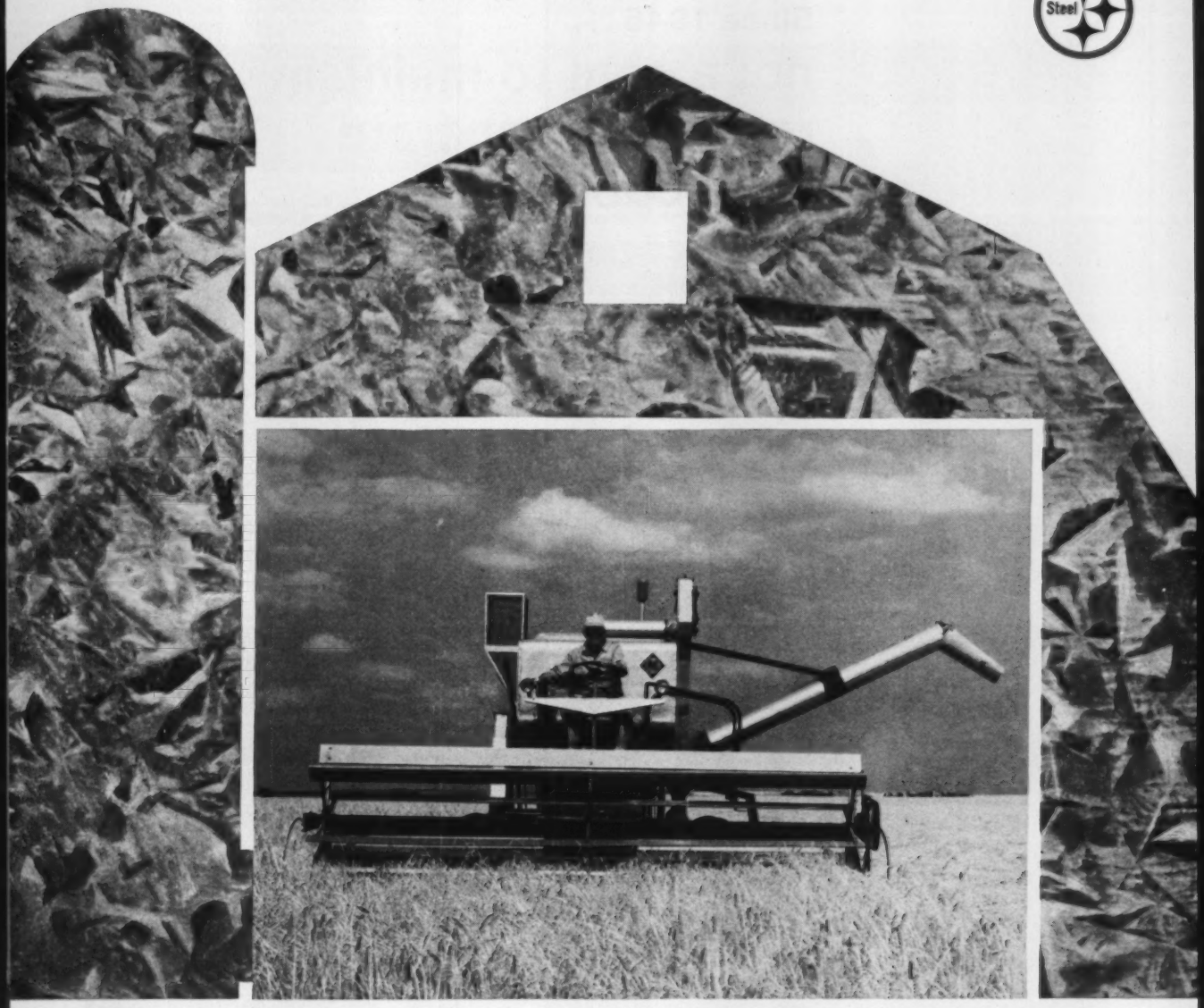
HILL 2-ROLL Vertical Abrasive Belt Grinding and Polishing machines are made in two general types for producing superior finishes on flat surfaces as required by manufacturers of decorative plastics, auto bumpers, engravers plates, home appliances, etc. Both types are built in polishing widths up to 60". Larger sizes can be furnished.

THE HILL ACME COMPANY

1209 WEST 65th STREET • • • CLEVELAND 2, OHIO

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "ACME" FORGING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • ROTARY SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES • MATERIAL HANDLING EQUIPMENT

Allis-Chalmers combines fend off corrosion . . .



GUARDED BY GALVANIZED STEEL

When you see a big Allis-Chalmers combine like this cutting grain on the farmlands of America you can be sure that galvanized steel has been used in its construction.

Reasons? First, galvanized steel provides excellent weather protection and low maintenance cost. Neither dew nor drizzle nor drenching rain will find a chink in its zinc coating. That holds true regardless of the severity of the fabricating steps to which it may be subjected. And in addition to its corrosion resistance, galvanized steel has a lot of resistance to high cost: It's easy and economical to fabricate, construct and maintain.

WEIRKOTE® IN PARTICULAR! The galvanized steel used in these combines is National Steel's Weirkote. To the inherent strength, economy and versatility of steel, Weirkote adds enduring zinc protection via the modern continuous process. As a result, Weirkote can be worked to the very limits of the steel base without chipping or peeling. And it assures you of long-lasting protection against corrosion. It is manufactured by two National Steel Corporation divisions, Weirton Steel and Midwest Steel. Write Weirton Steel Company, Weirton, West Virginia, for further details.

MIDWEST STEEL
Portage, Indiana

WEIRTON STEEL
Weirton, West Virginia

divisions of
NATIONAL STEEL CORPORATION

Since 1945 . . .

not a cent to maintain refractory concrete slow-cooling pits

For fifteen years these slow-cooling pits have been absorbing sudden thermal shocks as red-hot railroad axles are lowered into them. And with no maintenance required! Pits like these, constructed with LUMNITE calcium-aluminate cement and suitable aggregates, have low volume change which makes the concrete highly resistant to heating-cooling cycles. The monolithic walls have no vulnerable edges or joints that can be battered during charging and unloading. Construction of refractory concrete pits is economical, too. No skilled labor is required; reinforcing is easily built in; and concrete reaches service strength in 24 hours.

For greater convenience, castables containing LUMNITE cement are available from leading manufacturers of refractories. These are packaged mixtures, ready to use. Just add water, mix and place. For information write Universal Atlas Cement, 100 Park Avenue, New York 17, N. Y.

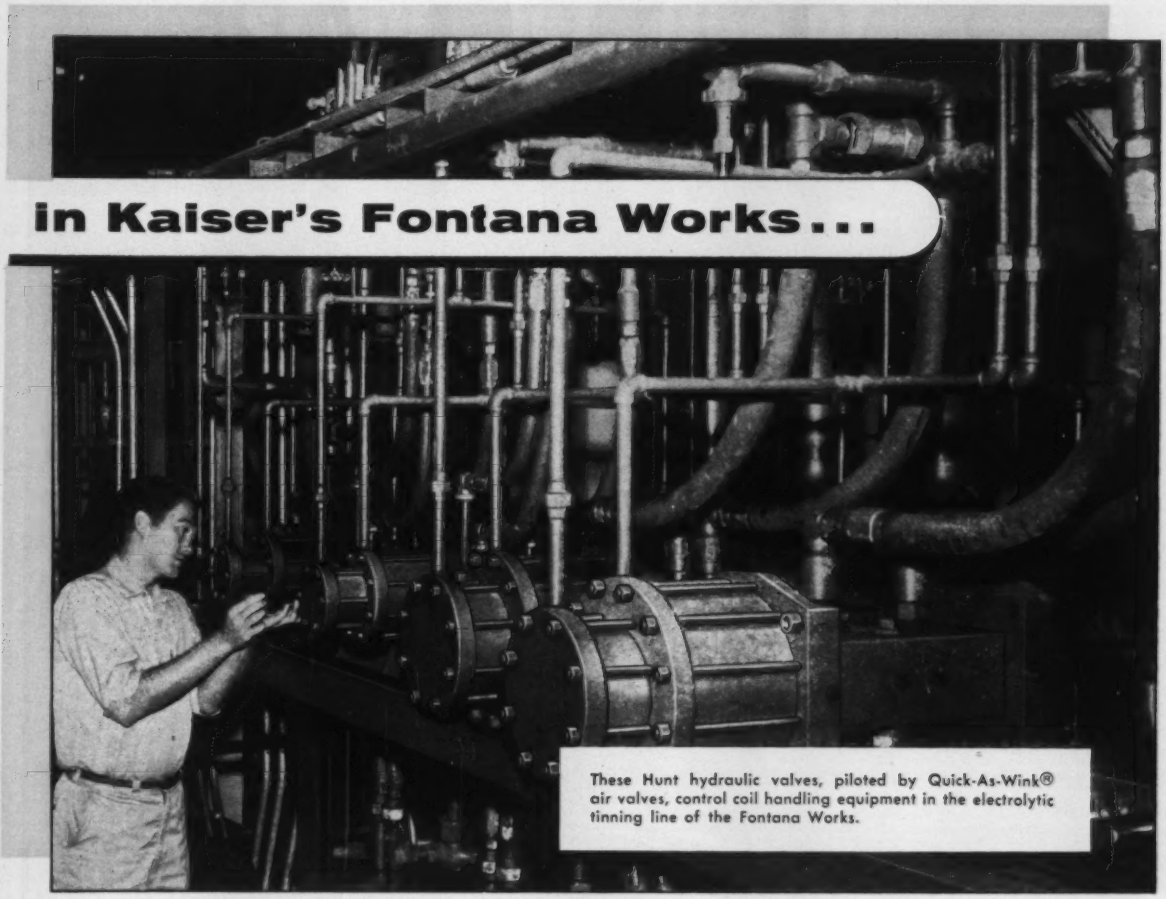
Nine of these slow-cooling pits, constructed with LUMNITE cement, have established service records at the Wheel and Axle Division of U. S. Steel's Homestead District Works. Pits measure 14'x14'x6' inside; walls taper 12" to 20" thick, top to bottom. Built by Rust Furnace Co., Pittsburgh.

Universal Atlas Cement
Division of
United States Steel

L-212

"USS," "Atlas" and "Lumnite" are registered trademarks

Offices: Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwaukee · Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco



in Kaiser's Fontana Works...

These Hunt hydraulic valves, piloted by Quick-As-Wink® air valves, control coil handling equipment in the electrolytic tinning line of the Fontana Works.

HUNT VALVES

deliver precise control... dependable performance

Used at key points throughout Kaiser's Fontana Works, Hunt air and hydraulic valves provide the precise, dependable control necessary to assure efficient production of high quality steel.

Hunt Valves are widely used in the plant . . . in the descaling systems as accumulator shut-offs and line descaling valves . . . to control coil handling equipment . . . and to control a variety of associated hydraulic systems, both oil and water soluble oil types. Three of the accumulator systems in the Fontana Works are controlled completely by Hunt Accumulator Control Panels.

The Hunt line includes valves in sizes ranging from ⅛ through 8 in. for vacuum to 300 psi air and for water, water soluble oil or oil to 5000 psi.

It'll pay you to find out why leading steel producers consistently choose Hunt valves. Your nearby Hunt representative can give you the facts. Call him today.

HUNT

QUICK-AS-WINK® AIR AND HYDRAULIC

VALVES

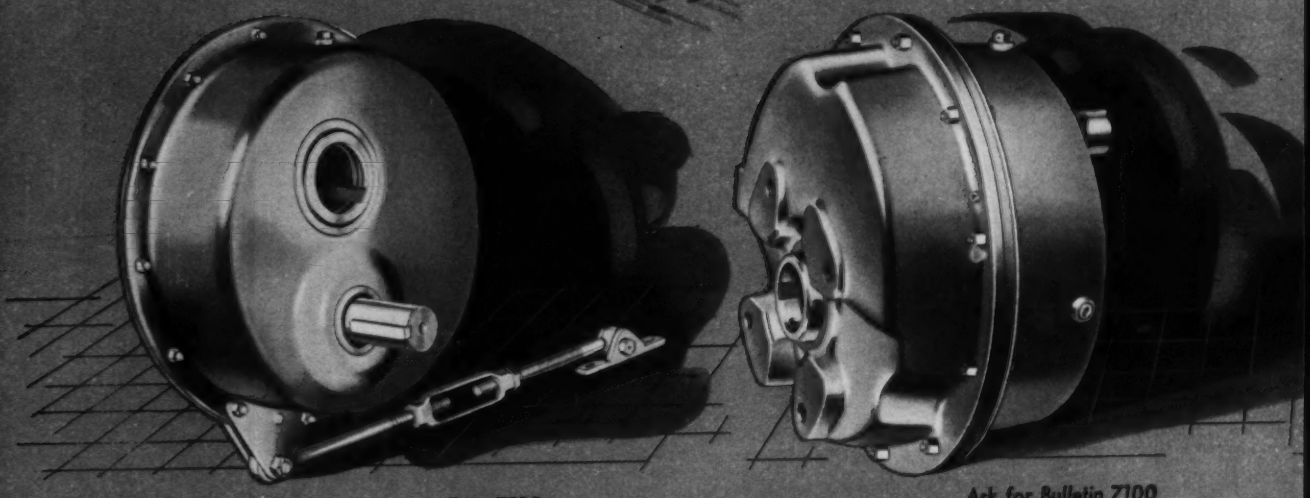
HUNT VALVE COMPANY • DIVISION OF IBEC • SALEM, OHIO

For more information, write for Bulletin 603. Address Dept. ST-361, Hunt Valve Company, Salem, Ohio.

3009

FALK

A GOOD NAME IN INDUSTRY



Ask for Bulletin 7100

Ask for Bulletin 7100

147 COMBINATIONS . . . horizontal or vertical applications . . . . .

UNIT SIZE	SHAFT MOUNTED DRIVES					
	RATIOS			MOTOR MOUNT	OVERLOAD RELEASE	BACK-STOP
	4	14	24*			
107J	X	X	X	X	X	X
115J	X	X	X	X	X	X
203J	X	X	X	X	X	X
207J	X	X	X	X	X	X
215J	X	X	X	X	X	X
307J	X	X	X	X	X	X
315J	X	X	X	X	X	X
407J		X	X	X	X	X
415J		X	X	X	X	X
507J		X	X	X	X	X

½ to 125 hp. Up to 100,000 lb-in. torque

UNIT SIZE	FLANGE MOUNTED DRIVES					
	RATIOS				BACK-STOP	MOTOR MOUNT
	4	9	14	24*		
107J	X	X	X	X	X	X
115J	X	X	X	X	X	X
203J	X	X	X	X	X	X
207J	X	X	X	X	X	X
215J	X	X	X	X	X	X
307J	X	X	X	X	X	X
315J	X		X	X	X	X
407J			X	X	X	X
415J			X	X	X	X
507J			X	X	X	X

*20:1 ratio for sizes 107 and 115

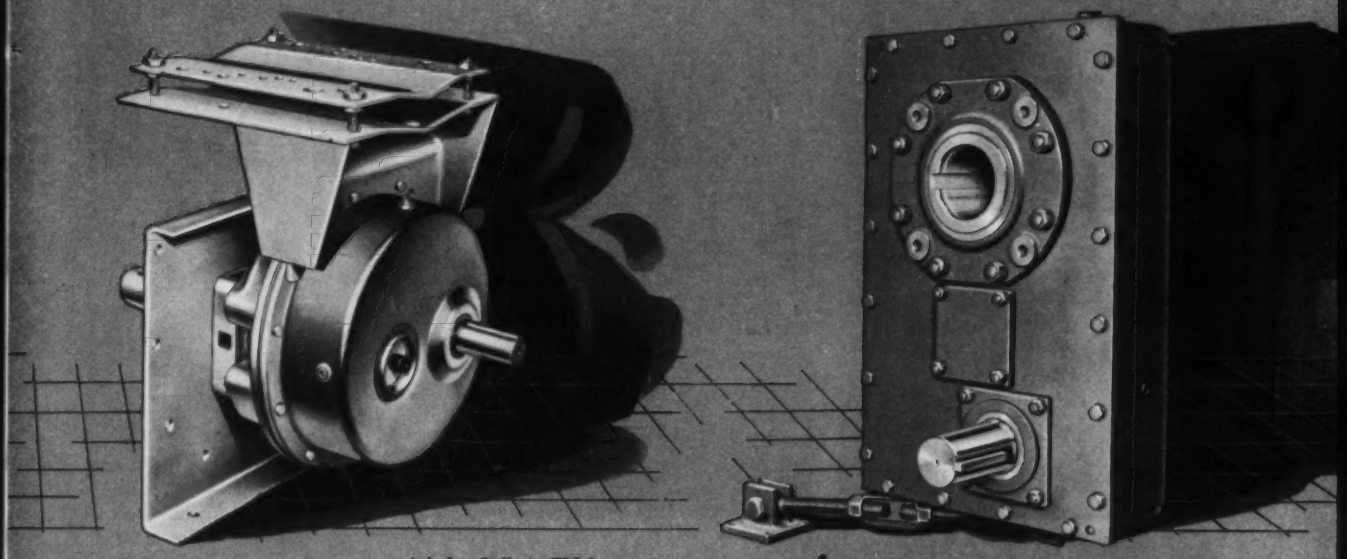
½ to 125 hp. Up to 100,000 lb-in.

Exclusively **FALK**... *Adaptability of all these three types of Falk Drives for use with Equi-Poised Motor Mount.* **This feature reduces costs of engineering and constructing motor bases and foundations.**

Exclusively **FALK**... *Interchangeable rotating elements* **size-for-size between Shaft and Flange Mounted Drives or Screw Conveyor Drives. This feature simplifies stocking and maintenance for large users.**

. the most complete line of SHAFT MOUNTED, FLANGE MOUNTED and SCREW CONVEYOR drives...

The line with the exclusive EQUI-POISED motor mount



Ask for Bulletin 7106

. . . . AVAILABLE FROM STOCK

UNIT SIZE	SCREW CONVEYOR DRIVES				
	RATIOS				MOTOR MOUNT
	4	9	14	24*	
107J	X	X	X	X	X
115J	X	X	X	X	X
203J	X	X	X	X	X
207J	X	X	X	X	X
215J	X	X	X	X	X
307J	X	X	X	X	X
315J	X		X	X	X
407J			X	X	X
415J					
507J					

½ to 40 hp. Up to 44,000 lb-in. torque

Exclusively **FALK...*Single helical gears*** **used in *all* sizes and types—they provide maximum (98½%) efficiency per gear mesh.**

FALK is a registered trademark

New 2 LARGER SIZES OF SHAFT MOUNTED DRIVES—415-507

Falk-designed and Falk-built for higher torque requirements, these all-steel, *helical* gear reducers are available in Shaft and Flange Mounted Drive design.

TWO RATIOS, 15:1 and 25:1
HORSEPOWER RATINGS TO 125
TORQUE RATINGS TO 100,000 LB-IN.

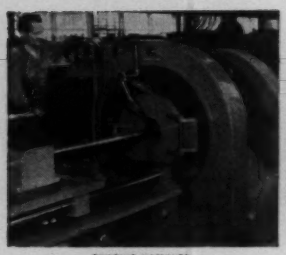
Ask for **Bulletin 7100.1 (Shaft and Flange Mounted Drives) or for Bulletin 7106.1 (Screw Conveyor Drives).**

THE FALK CORPORATION
MILWAUKEE 1, WISCONSIN

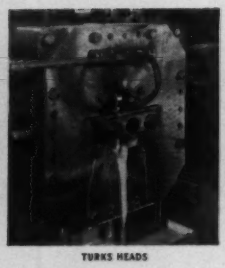
Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

Representatives and Distributors in most principal cities

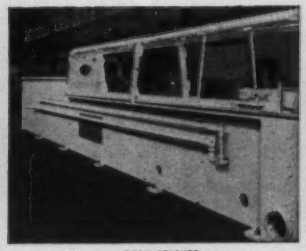
A POINT TO PONDER..when you need gear drives or shaft couplings of "FALK OR EQUAL" quality, where but from Falk can you get the "OR EQUAL"?



SWAGING MACHINES



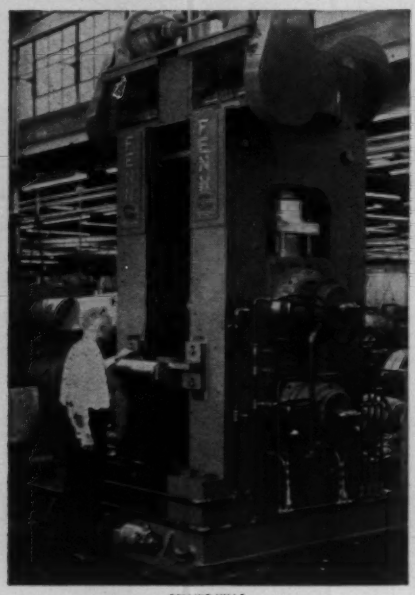
TURKS HEADS



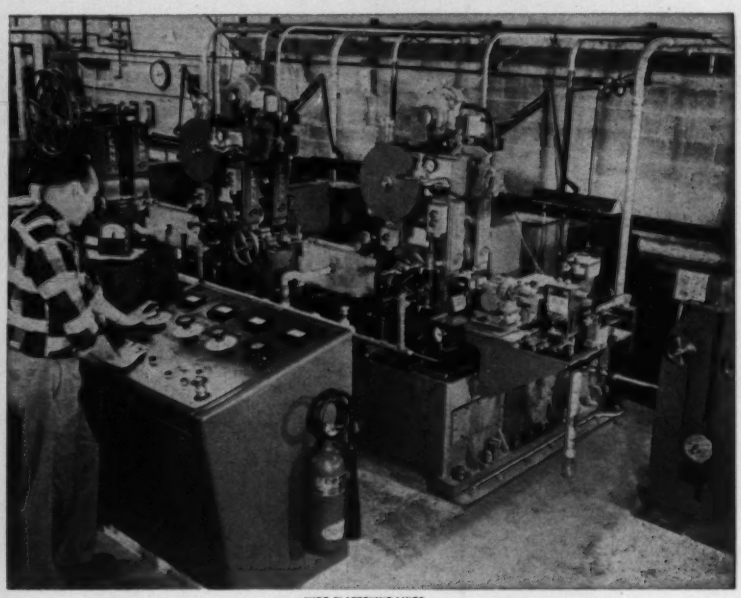
DRAW BENCHES

WIRE AND TUBE MILLS

PRECISION • PERFORMANCE • DEPENDABILITY



ROLLING MILLS



WIRE FLATTENING LINES

METAL FORMING MACHINES

that meet the challenges of the 60's

Within a relatively short span of years the name FENN has become well-known to users of metal forming equipment. In rolling mills . . . wire mills . . . in the nuclear industry . . . and wherever else ferrous or nonferrous metals are rolled, drawn, or formed to precision tolerances, Fenn machines are producing profits for their users. The extensive Fenn line is built on long experience in the manufacture of *precision* machinery and an equally long reputation for *performance* and *dependability*. Behind every Fenn machine is unexcelled engineering . . . from design to inplant checkout and continuing field service, plus an organization that strives to do every job better than the expected. Whatever your metal forming machinery requirements, you can depend upon your nearest Fenn representative for his experienced advice and practical help. Comprehensive literature will be promptly sent upon request. The Fenn Manufacturing Company, Fenn Road, Newington, Connecticut.

Designed and Built by FENN

Above-ground penstock section of USS "T-1" Steel winds downward from Whiteman's Pond at 50 degree maximum slope angles for 1,400 feet and approximately 50 degrees in the 220-foot tunnel at the bottom. Water will have a head of 905 feet and drive a turbine to produce 50,000 KW of electric power.

Towering five stories high, this vertical cooling tower forms a vital part of United States Steel's spectacular new heat treating facilities shown on the next two pages. The forging is placed on a stool which can be rotated. Cooling is accomplished by the use of air or water, as required.

PLEASE LIFT FLAP

Calgary Power installs first USS "T-1" Steel penstock in America

Near Chinaman's Peak in the Canadian Rockies, Calgary Power, Ltd., has completed the first penstock in this hemisphere built with USS "T-1" Steel. The 1,601-foot-long, 8′-diameter penstock is part of their "Spray No. 2 Project" to produce more hydroelectric power for the Calgary Power System in Alberta, Canada.

Montreal Engineering Co., Ltd., who recognized the value of USS "T-1" Steel as an excellent constructional alloy steel for such applications as high head penstocks several years ago, proposed its use when the design work started. Their engineers specified USS "T-1" Steel for this penstock because the steel's minimum yield strength of 100,000 psi made possible nearly a 50% savings in the amount of steel required. This saving helped to reduce substantially the transportation and erection costs that would have been required had structural carbon steel been used in this mountainous location.

In the new Calgary penstock, 500 tons of USS "T-1" Steel plate 5/16″ to 3/4″ thick were used by Dominion Bridge to fabricate the segments, or "cans" in its Calgary plant. These segments are 8′ to 7′ in diameter.

It was significant that the penstock was designed to a 37,000 psi unit working stress (or approximately 41,000 psi unit stress at 90% joint efficiency). This is more than 28% greater than the ASME code case 1204-4 allows for pressure vessels fabricated of "T-1" Steel in the United States.

USS "T-1" Steel was selected for its exceptional strength and toughness, even at very low temperatures, and its ready weldability. What's more, it eliminates the cost of stress relieving. Write for the complete story to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS and "T-1" are registered trademarks

United States Steel Corporation, Pittsburgh • Columbia-Geneva Steel, San Francisco • National Tube, Pittsburgh • Tennessee Coal & Iron, Fairfield, Alabama • United States Steel Supply, Steel Service Centers United States Steel Export Company

This mark tells you a product is made of modern, dependable Steel.

USS United States Steel

This mark tells you a product is made of modern, dependable Steel.

From the cradle to the lathe

New vertical heat-treating facilities handle world's largest rotors

How would you handle a forging that starts out as a 521,000-pound ingot and ends up as one of the world's largest generator rotors weighing 114 tons?

To accommodate forgings like this at its Homestead Works, United States Steel has installed seven new vertical heat-treating furnaces, a cooling tower and a unique "upender" cradle which tilts these large forgings with ease to a vertical position for crane pick-up. The new furnaces rise 25 feet above, and extend 25 feet below the floor. They can accommodate turbine and generator rotors with an overall length of 45 feet maximum and a maximum body diameter of 60 inches.

The vertical heating and cooling equipment allows large rotors to be uniformly heat treated in the upright position after they have been forged and machined.

One of the outstanding jobs for the new equipment was heat treating some of the largest generator rotors ever made. One of these is shown below being machined in the 120-inch lathe after it received its heat treatment. (The smaller rotor suspended from the crane in the big picture at the left is a different forging.)

In forgings such as these, heating and cooling operations must be carefully controlled to assure proper structure in the steel. Using the skill that only time and experience could give him, Al Sauer, a veteran in our Homestead Works, supervises the careful heat treating of these forgings. After heating, they are transferred to the 50′ high cooling tower where they are cooled at controlled rates. Then they go back for further machining, testing, boring, more heat treating, final machining, sonic inspection, and shipment.

United States Steel makes many forgings for all kinds of applications. Here, a team of experts supervises and controls every step of forging production. Let them handle *your* next order. For more detailed information about USS Quality Forgings, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

United States Steel Corporation, Pittsburgh • Columbia-Geneva Steel, San Francisco • Tennessee Coal & Iron, Fairfield, Alabama
United States Steel Export Company

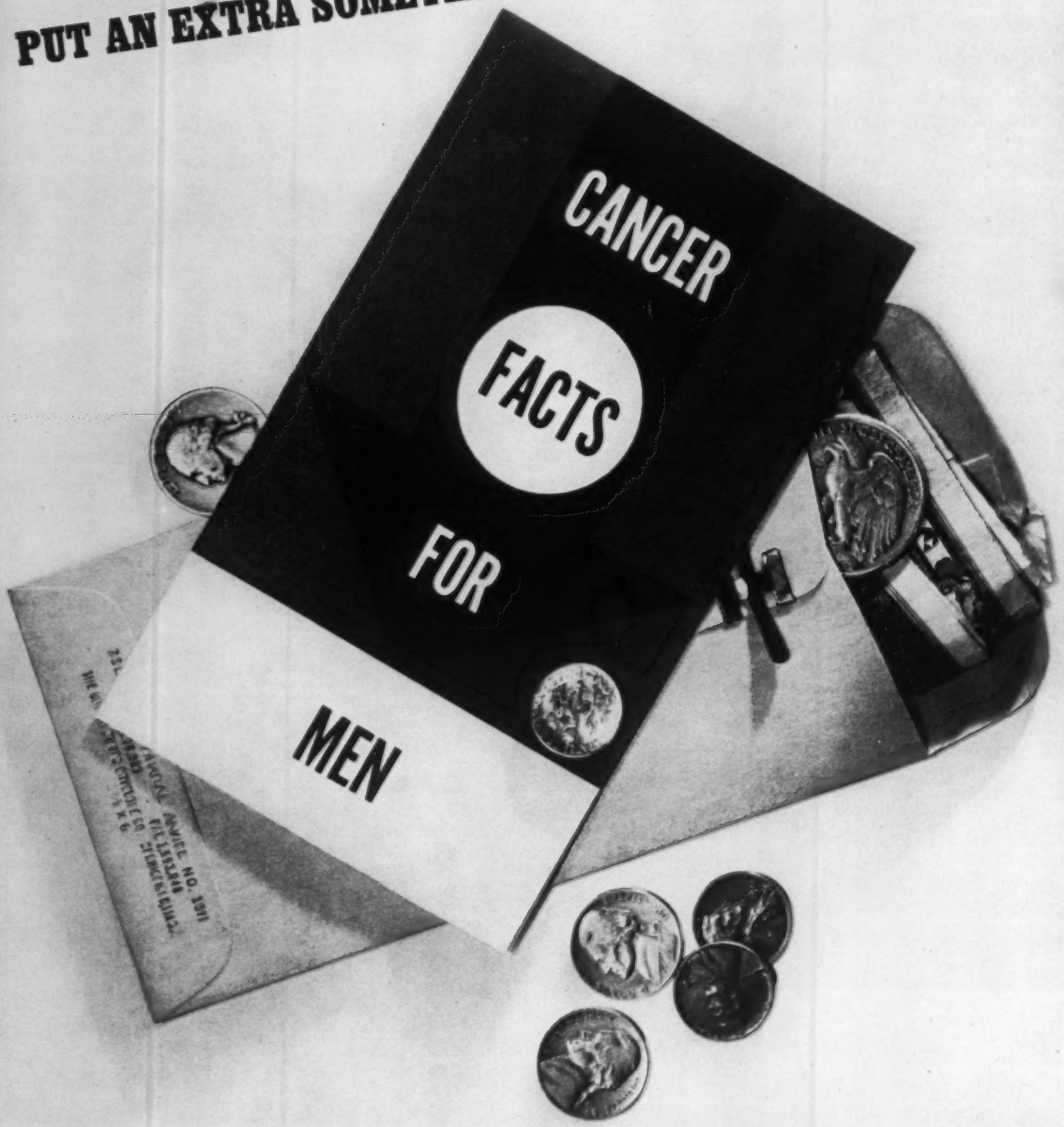
◀ Shown here are four of the seven new vertical heat-treating furnaces, housed in a modern 125 foot high building, that give United States Steel the ability to handle the largest generator and turbine rotor forgings that can be made.

One of the world's largest generator forgings being machined in our 120-inch lathe. After final machining, it weighed 114 tons. ▶

USS United States Steel

TRADEMARK

PUT AN EXTRA SOMETHING IN THEIR PAY ENVELOPES



It could be the biggest bonus you ever gave your employees—life-saving facts about cancer. Whether you have a factory or an office—a hundred or a thousand employees—we are prepared to offer a cancer education program to meet your particular requirements. Pamphlets, posters, films and speakers will bring vital information to your employees. Such programs pay off in saving lives. Call your local American Cancer Society for further information. Do it today.

American Cancer Society®

TRADEMARK

SAFER CLEANING FOR SENSITIVE WHITE METALS

CHLOROTHENE® NU cold-degreasing solvent is not only safe for white metals but can be used safely on *all* common metals, including aluminum and zinc, on most electric motors, instruments, and many plastics. Chlorothene NU also has all the desirable characteristics of the nonflammable chlorinated solvents *plus* less toxicity. Maximum allowable vapor concentration is a high 500 ppm compared to carbon tetrachloride at 25 ppm.

The superiority of Chlorothene NU in its resistance to fire is outstanding—it has *no* fire or flash point measurable by standard methods! This combination of low toxicity and no flash point has led to the wide use of Chlorothene NU in production and maintenance cold-degreasing operations. Effective by spray, dip, bucket, or wiping methods. Chlorothene NU specially inhibited 1,1,1-trichloroethane is easily recovered by distillation.

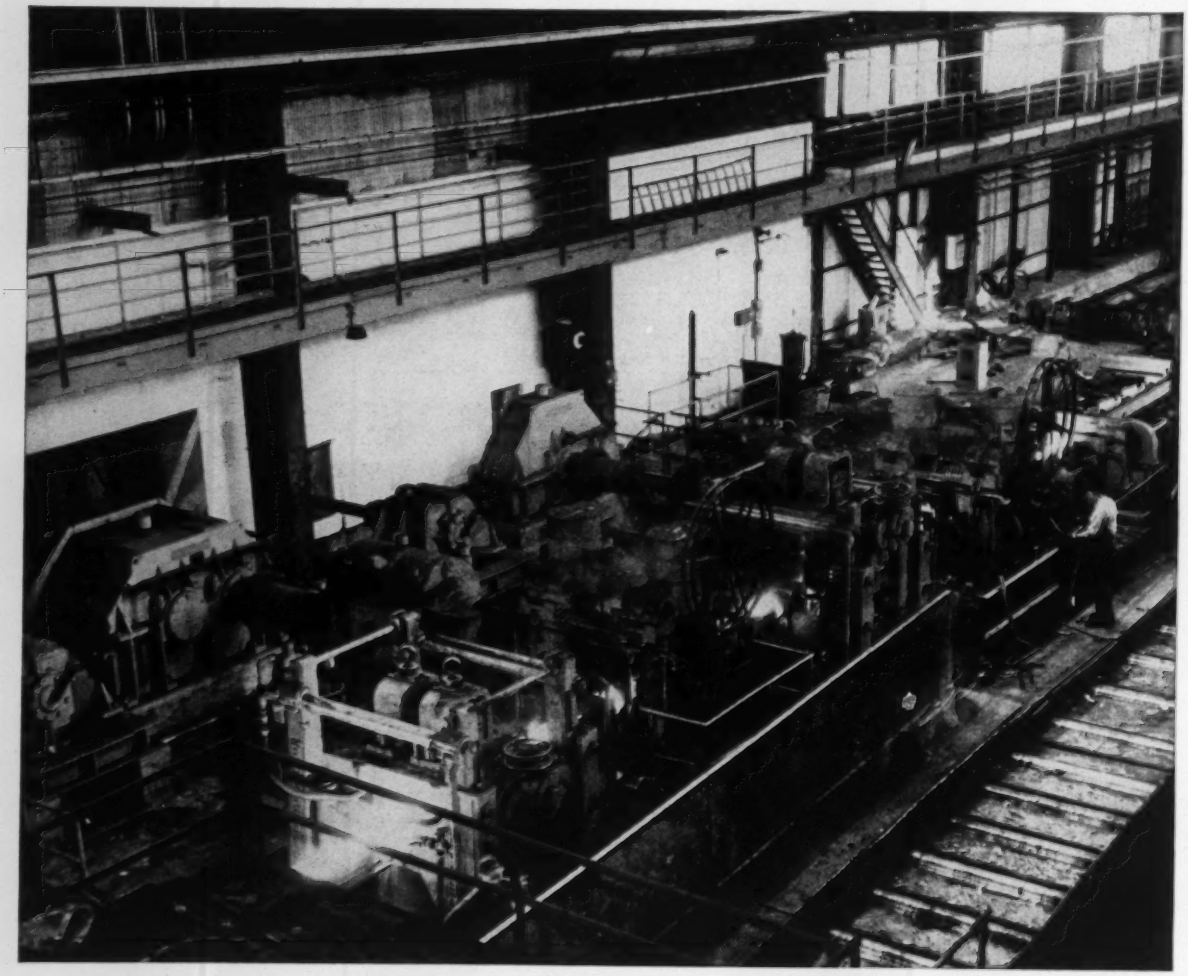
Use Chlorothene NU in *your* cold degreasing. Contact your distributor of Dow solvents for complete information about its safety features, uses, recovery and cost. Ask him about Dow trichloroethylene, perchloroethylene and methylene chloride, too. Or get in touch with your nearest Dow sales office.

SEE YOUR DISTRIBUTOR OF DOW SOLVENTS FIRST!

THE DOW CHEMICAL COMPANY DOW Midland, Michigan

New, faster **BIRDSBORO** *20" Continuous Mill produces up to 100 tons per hour*

This 20" Continuous Mill engineered and built by Birdsboro for Aristoloy Steel Division of Copperweld Steel has two vertical and two horizontal roll stands. The use of vertical and horizontal stands permits the mill to roll rounds, squares and flats without twist guides. The use of bevel gear angle drives for the vertical stands permits placing all the main mill motors on the same level in the motor room. Copperweld has successfully rolled 5-inch squares, although design capacity is $2\frac{1}{2}$" to $4\frac{3}{4}$" squares. The mill is designed to take blooms rolled direct from the ingot by the breakdown mill without reheating. Even high chrome nickel grades of steel that normally require reheating after reduction to 5- to 7-inch squares can be reduced direct to the smallest billet sizes without reheat. The installation of this Birdsboro mill with its many design extras has helped give Copperweld new flexibility of production while reducing costs. Birdsboro custom engineering can solve your production problems and open new profit doors for your mill operations. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pennsylvania; *District Office:* Pittsburgh, Pennsylvania.



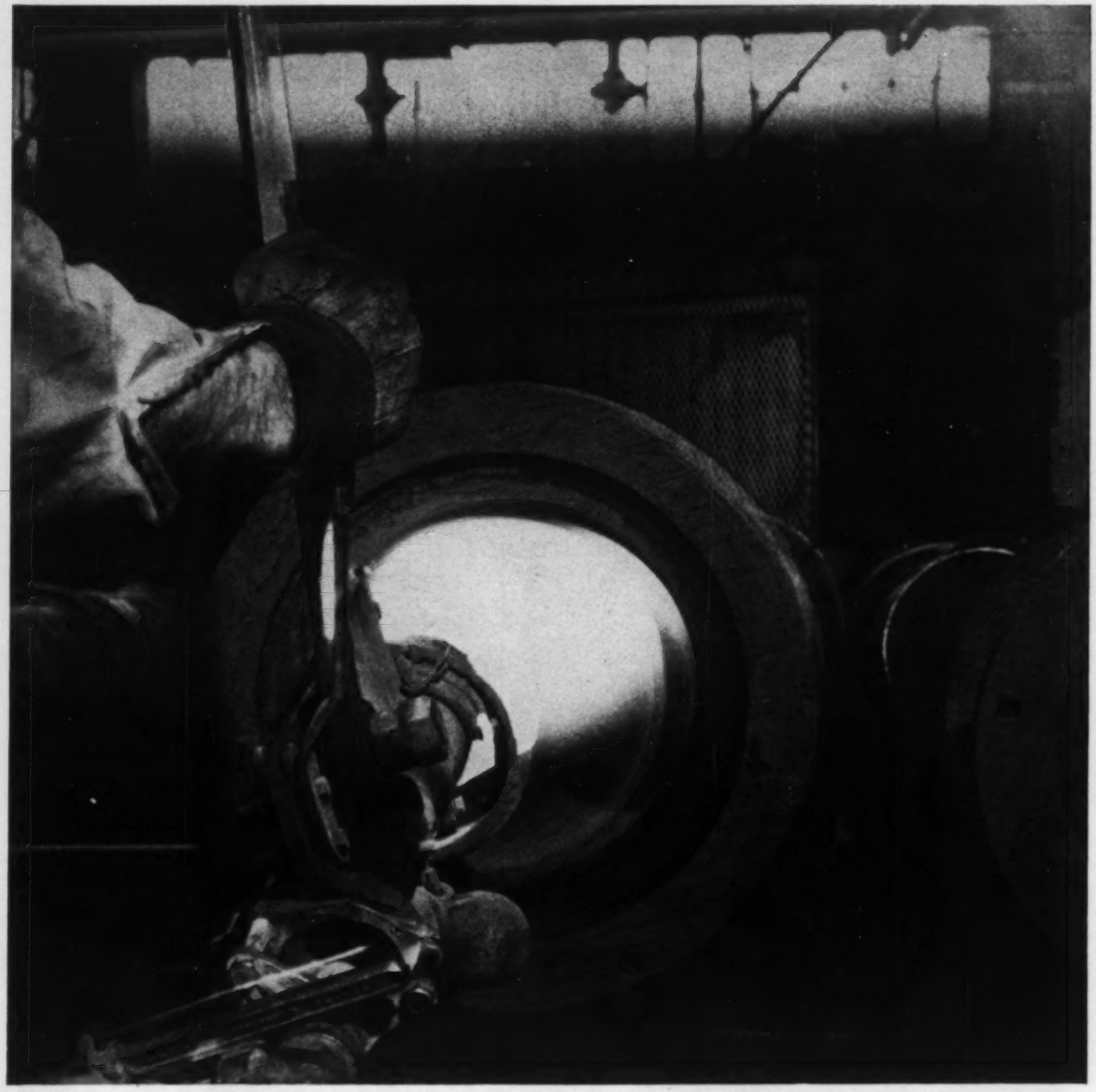
MM79-59

BIRDSBORO

CORPORATION BIRDSBORO, PENNA.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS • ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL

Intense heat from four Gas-fired torches skin dries pipe molds in as little as 2 minutes, after ramming and facing with a blacking material.



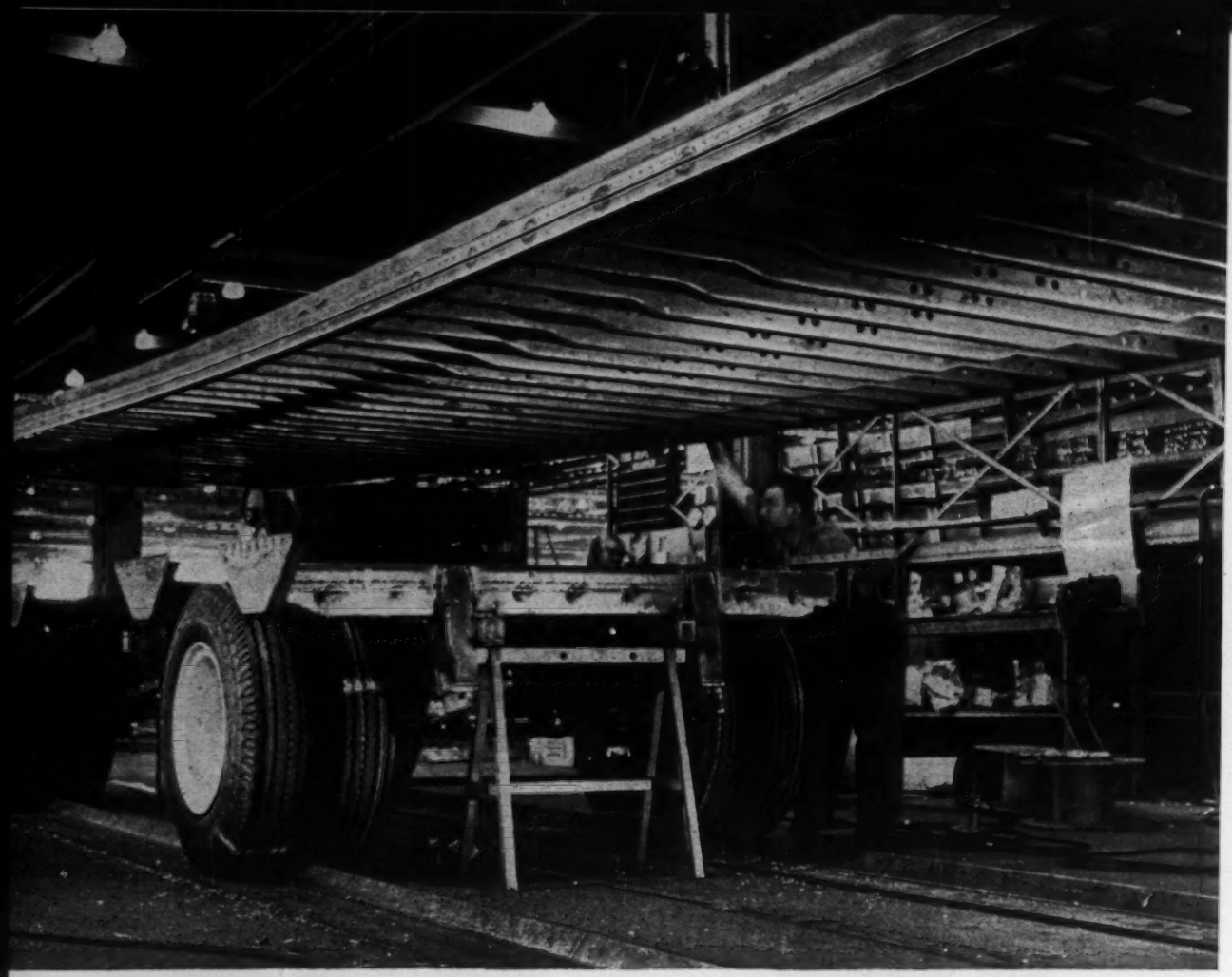
Only GAS provides the clean, uniform heat needed to skin dry pipe molds! Millions of BTU's of clean, uniform heat are required every hour by Warren Foundry & Pipe Division of Shahmoon Industries, Inc., Everett, Massachusetts, to skin dry its pipe molds.

Only Gas provides this volume of heat without any problems of shipping and storage. That's why Warren Foundry chose Gas to solve this large scale heating problem. And as plant engineer William Mitchell says, "We chose Gas over other fuels because of its cleanliness and uniformity of heat value."

For information on how Gas can help you with your production problems, call your Gas Company's Industrial Sales Engineer. He'll be glad to discuss with you the economies and outstanding results you get with the clean, uniform heat of Gas, and modern Gas-fired industrial equipment. AMERICAN GAS ASSOCIATION

FOR CONTROLLED INDUSTRIAL HEATING

. . . GAS IS GOOD BUSINESS!



At Fruehauf Trailers' huge Avon Lake, Ohio, plant, crossmembers made from PITT-TEN high strength structural sheet provide 22 percent more payload.

Here, on the assembly line, a Fruehauf trailer bed made with Pittsburgh Steel Co. PITT-TEN is swung onto the underconstruction assembly.

As Trailer Bed Crossmembers

Fruehauf Gets 22% More Payload With Pittsburgh Steel's New PITT-TEN

Twenty-two percent more payload—that's what Fruehauf is building into the framework of giant trailers assembled with crossmembers made of PITT-TEN, Pittsburgh Steel Company's new high strength structural sheet.

Fruehauf uses PITT-TEN #1 at its Avon Lake, Ohio, plant—the largest trailer manufacturing facility in the world—because it offers a combination of benefits that . . .

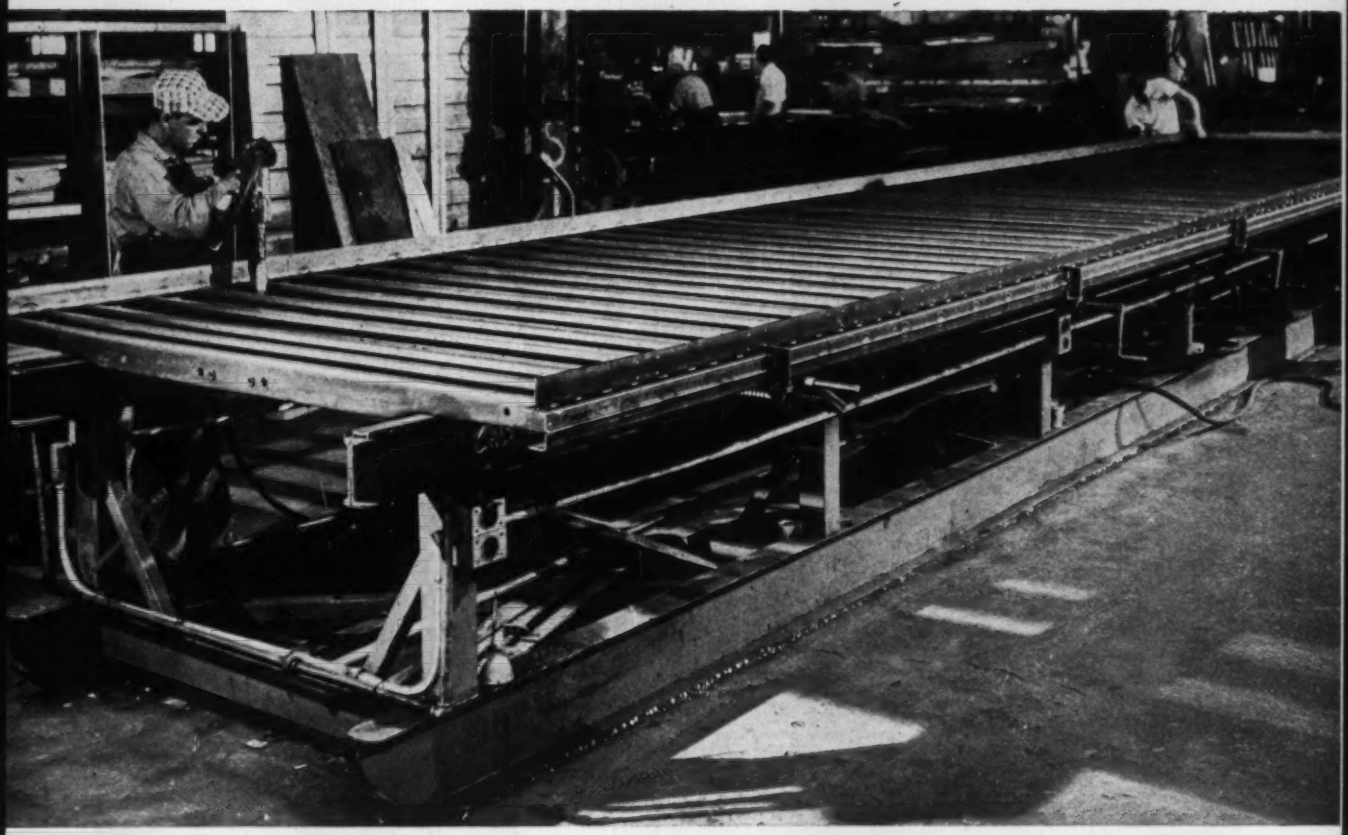
- **Cuts deadweight with no loss of strength**
- **Lengthens service life through superior corrosion resistance**
- **Light Yet Strong** — Fruehauf tries to make its trailers as light as possible with no sacrifice in strength. Trailer bed crossmembers made of high strength PITT-TEN are lighter, for equal strength, than mild steel.

The weight saving amounts to more than eight pounds for each piece. That's because three pounds of PITT-TEN do the work of nearly four pounds of ordinary sheet steel. At the same time, it provides all the strength needed for years of hard use.

Corrosion resistance is another problem in trailer operation. Fruehauf trailers are used under all types of conditions that could create maintenance headaches if the proper material were not used.

PITT-TEN #1 has four to six times the resistance of carbon steel to atmospheric corrosion. So, Fruehauf specifies PITT-TEN to reduce maintenance costs.

The trailer part basically is a channel 93⅞ inches long, 2 inches deep and 3 inches wide. Its width is expanded to 4½ inches on one side by an offset that extends most of its length. In addition, a ¾-inch



During assembly of Fruehauf trailer bed, cross-members made from high strength structural PITT-TEN are riveted to the side rail. PITT-TEN #1 reduces maintenance requirements of Fruehauf trailers through superior corrosion resistance. It has four to six times the corrosion resistance of carbon steel to atmospheric corrosion. PITT-TEN also cuts deadweight with no loss in strength.

return flange is applied full length to both edges.

Fruehauf engineers point out that forming this piece with offset and flange in high tensile steel would be a tricky business without consistent quality — and with PITT-TEN Fruehauf has a steel that does the job.

PITTSBURGH STEEL NEW SOURCE – This is one of several applications which mark the entry of Pittsburgh Steel in the high strength steel market, one of the fastest growing in metalworking.

That means this:

Fabricators of high strength steel structurals—or any product where the weight/strength ratio is a factor—now have a new source of supply.

In the eight years Pittsburgh Steel has been producing flat-rolled products, it has become recognized for the unexcelled quality of its steel sheet and strip. Now PITT-TEN is being produced by the same fine steelmaking and steel rolling facilities which have earned that reputation for quality.

PITT-TEN is produced in three grades, each with specific physical properties. Briefly, here they are:

PITT-TEN #1—An all-around high strength structural sheet that offers a combination of benefits. First is greater strength without increased weight; or equal strength with a lighter section. Second is longer product life, less maintenance through greater resistance to corrosion (four to six times that of mild carbon steel.)

PITT-TEN #2—high strength sheet with exceptional formability. This grade is produced to tensile and yield requirements to meet forming problems of specific fabricated parts.

PITT-TEN "X"—produced to guaranteed minimum yield points of 45,000 and 50,000 psi. This grade is especially useful where the controlling factor is a reduction in weight without loss of strength.

If your product's success depends on weight/strength factors, then Pittsburgh Steel's new PITT-TEN can benefit you, too.

Let one of our service metallurgists show you how. They're as familiar with steel fabricating problems as they are with steelmaking problems. Just contact one of the sales offices listed here.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

DISTRICT SALES OFFICES

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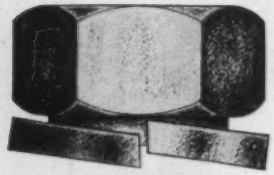
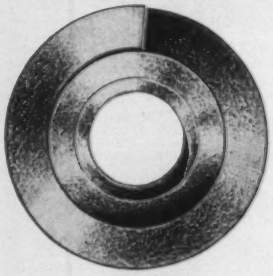
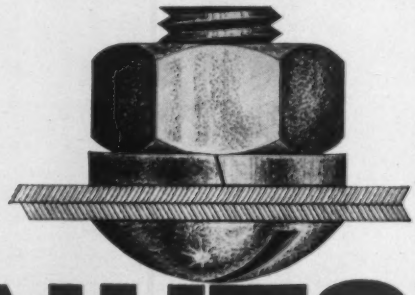
Chicago	Dallas	Detroit	New York	Tulsa
		Houston	Philadelphia	Warren, Ohio

Steel

new

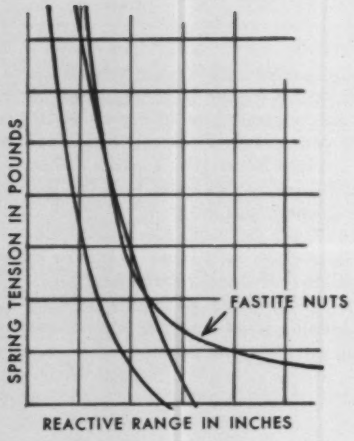






EATON-RELIANCE

FASTITE NUTS



Here is the answer to the growing need by designers and production men for more efficient fasteners on bolted assemblies. The Fastite assembly is a combination nut and helical spring washer, permanently held together, but free to rotate when pressure is applied.

Although it can be applied with equal or better speed than similar fasteners, the biggest advantage of the Fastite nut is the incorporation of the helical spring washer which provides a much greater reactive range and tension than other types of washers now being used.

Of three fasteners tested, the comparative release curve analysis showed the Fastite nut exerted 100 pounds more reactive spring tension when tight than either of the other two fasteners. More interesting, however, from the viewpoint of assembly problems is that the other fasteners lost all reactive spring tension when backed off to .016 inches whereas the Fastite nut still registered 150 pounds. In fact, the Fastite nut still showed reactive tension at .070 inches. The comparative curves are shown at left. A detailed graph of these curves is available for your inspection in the Engineering Bulletin offered below.

Translated into terms of product quality, this simply means the Eaton-Reliance Fastite nut is the best fastener available to reduce the incidence of failure in bolted components due to the ever present problems of bolt stretch and thread wear. Specify Eaton-Reliance Fastite nuts on your next order.

Send for Fastite Nuts Engineering Bulletin, no obligation.

EATON

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MANUFACTURING COMPANY
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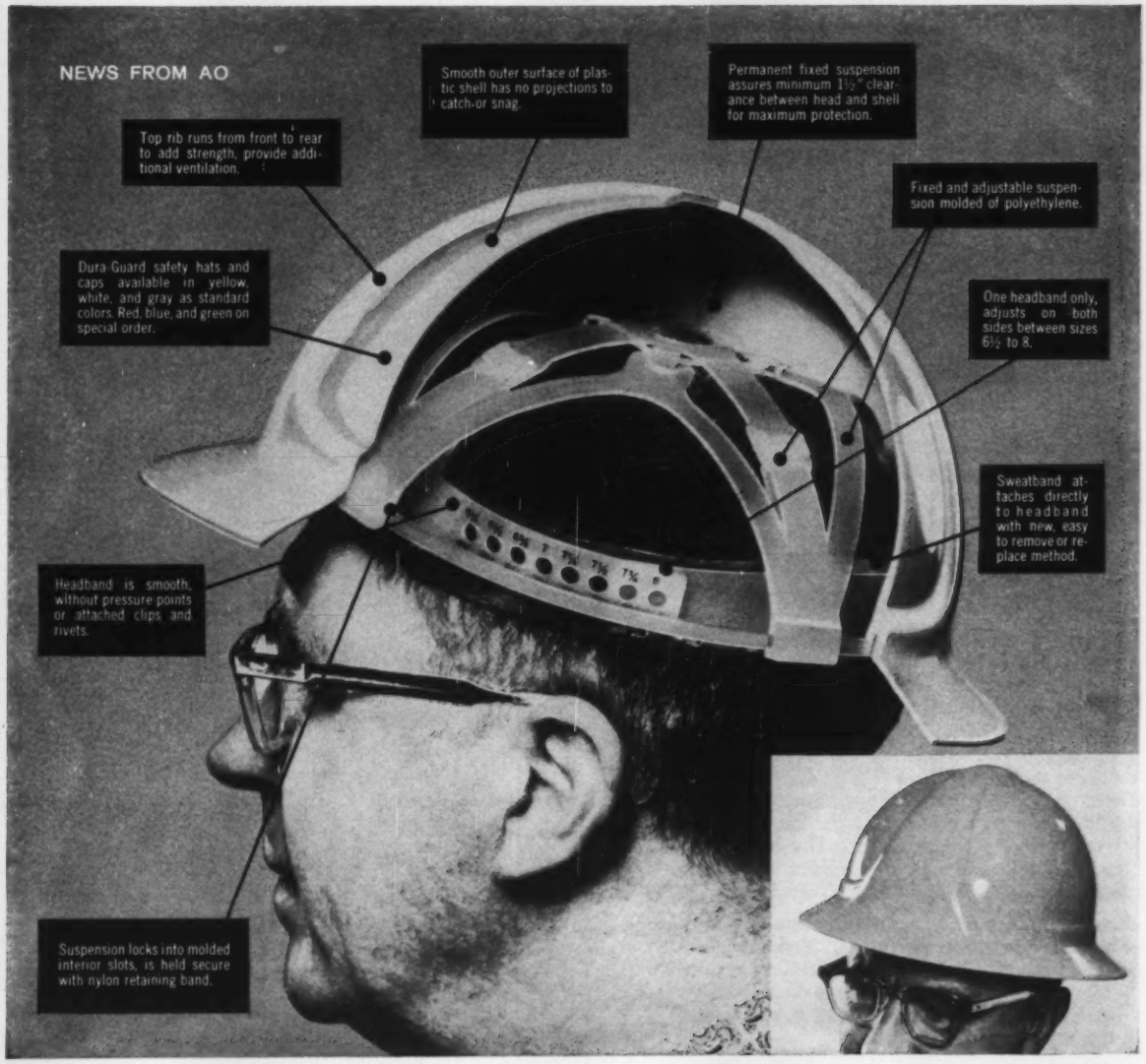
NEWS FROM AO
Smooth outer surface of plastic shell has no projections to catch or snag.
Permanent fixed suspension assures minimum 1½" clearance between head and shell for maximum protection.
Top rib runs from front to rear to add strength, provide additional ventilation.
Fixed and adjustable suspension molded of polyethylene.
Dura-Guard safety hats and caps available in yellow, white, and gray as standard colors. Red, blue, and green on special order.
One headband only, adjusts on both sides between sizes 6½ to 8.
Sweatband attaches directly to headband with new, easy to remove or replace method.
Headband is smooth, without pressure points or attached clips and rivets.
Suspension locks into molded interior slots, is held secure with nylon retaining band.

Now: one safety hat to meet all requirements

Introducing the AO Dura-Guard . . . an *all-new* safety hat designed for *universal use*. Shells and suspensions are molded plastic, without holes or metal parts. New Dura-Guard hats and caps meet or exceed all standard specifications, and *every* Dura-Guard may be used wherever dielectric protection is required. Dielectric strength in accordance with E. E. I. specifications (April 1954) is available in individually tested hats and caps.

The injection molded shell is of uniform thickness throughout critical areas. Plastic suspension and headband are lightweight, comfortable, long-wearing, nonconductive, easy to clean. Headband adjusts on *both* sides to stay centered in shell, eliminate floating. Sweatband can easily be slipped out for cleaning *without removing any other part*, is made in telescoping halves for comfort and economy. Front half, which tends to soil or wear first, can be replaced at minimum cost.

For full information, contact your AO Safety Products Representative, or write for Folder S-1456.

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American Optical COMPANY

SAFETY PRODUCTS DIVISION • SOUTHBRIDGE, MASSACHUSETTS

CRANE WITH ROTATING TROLLEY SPEEDS WAREHOUSE HANDLING

Storage area for tubing used in the production of tapered roller bearings at The Timken Roller Bearing Company, Bucyrus, Ohio. A Cleveland Tramrail double-girder completely motorized crane handles the material in and out of storage and to the machine tools. The crane can travel the entire length of the department and the trolley will rotate 360 degrees, enabling the operator to turn full bundles into position required for loading machine racks.

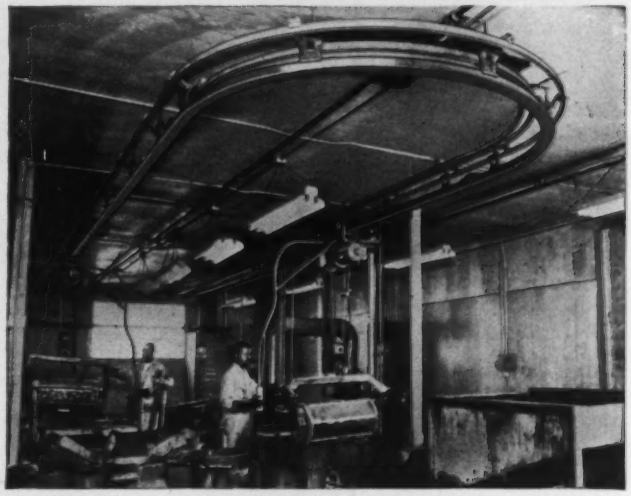
CLEVELAND TRAMRAIL USED IN MANY WAYS TO PRODUCE IMPORTANT SAVINGS

TRAMRAIL SYSTEM HANDLES VALVES THROUGH VARIOUS STEPS OF MANUFACTURE

Provides 80% Floor Space Savings

This is not a blurred picture. What makes it appear so is the vast number of chains suspended from hundreds of Cleveland Tramrail carriers which are used at the Mason-Neilan Division, Worthington Corporation, Norwood, Massachusetts, to carry valves through the various steps of manufacture. The entire system of production is dependent upon the performance of the overhead Tramrail.

A very important advantage of the Tramrail system is the large savings in floor space it makes possible. If floor type handling equipment were used, it has been estimated that about five times as much floor space would have been required.



TRAMRAIL TRACK LOOP CUTS CLEANING AND PLATING COSTS

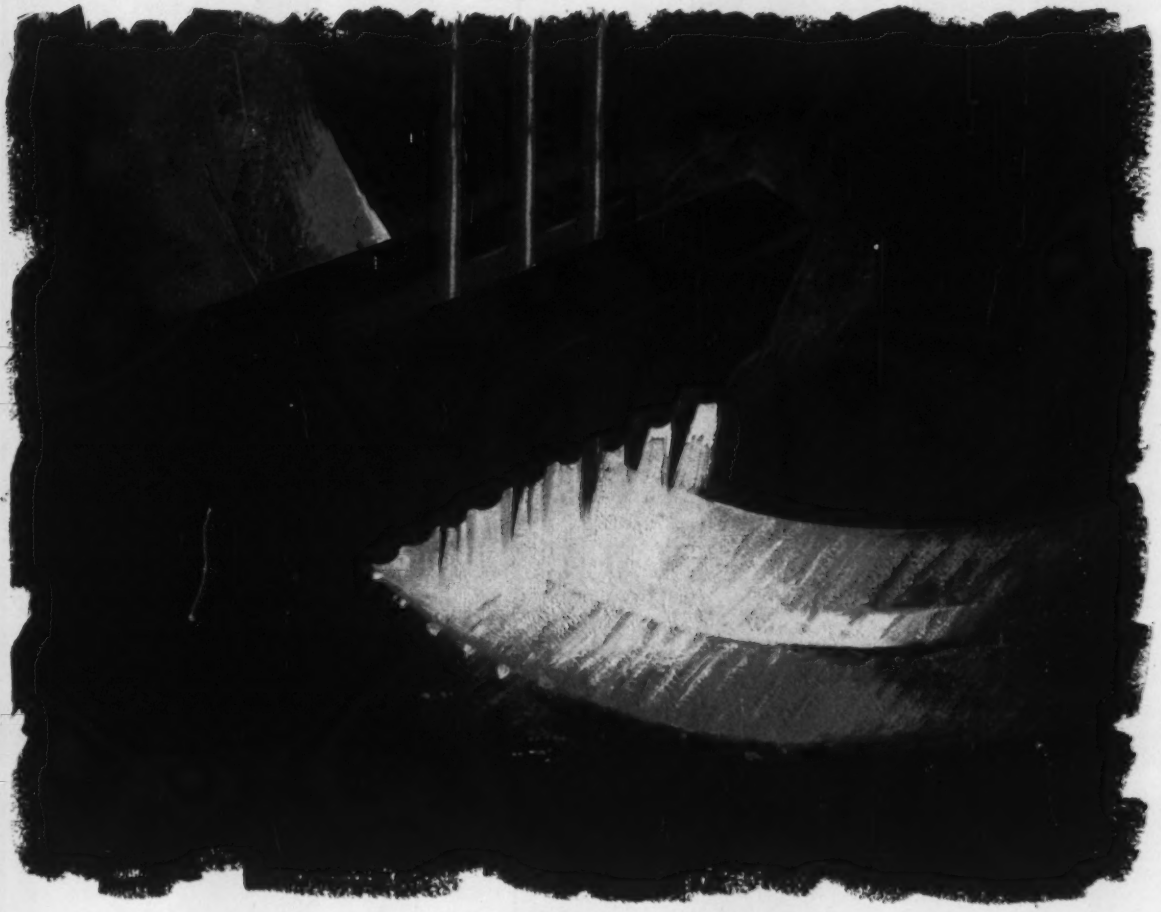
This Cleveland Tramrail track loop at the Duro Fittings Co., Los Angeles, California, is a big factor in cutting costs and speeding parts between cleaning and plating operations. Two hand-operated carriers with electric hoists serve this work at high efficiency.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information. Profusely illustrated.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7848 E. 290 ST. • WICKLIFFE, OHIO



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Mechanized deposits conform closely to specified requirements. As a result there are fewer rejects. The machines maintain adequate preheat, proper proportioning of welding flames, and a continuous supply of molten metal. Gas consumption per part is lower. A minimum of manual effort is needed to turn out high-quality hard-faced parts.

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Blaw-Knox designs and builds a full range of continuous, semi-continuous and single stand reversing hot strip mills. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-ferrous metals, sheet and strip processing equipment, electrolytic tinning, annealing, and galvanizing lines, seamless pipe and tube mills, draw benches, and cold draw equipment, Blaw-Knox Medart cold finishing equipment, iron, alloy iron and steel rolls, carbon and alloy steel castings, fabricated steel plate or cast-weld design weldments, steel plant equipment, and heat and corrosion resisting alloy castings. Blaw-Knox Company, Foundry and Mill Machinery Division, Blaw-Knox Building, 300 Sixth Avenue, Pittsburgh 22, Pennsylvania.

56-inch semi-continuous hot strip mill.

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CUT SOLVENT COSTS IN HALF—by recovering more than ½ drum of solvent for every drum used!

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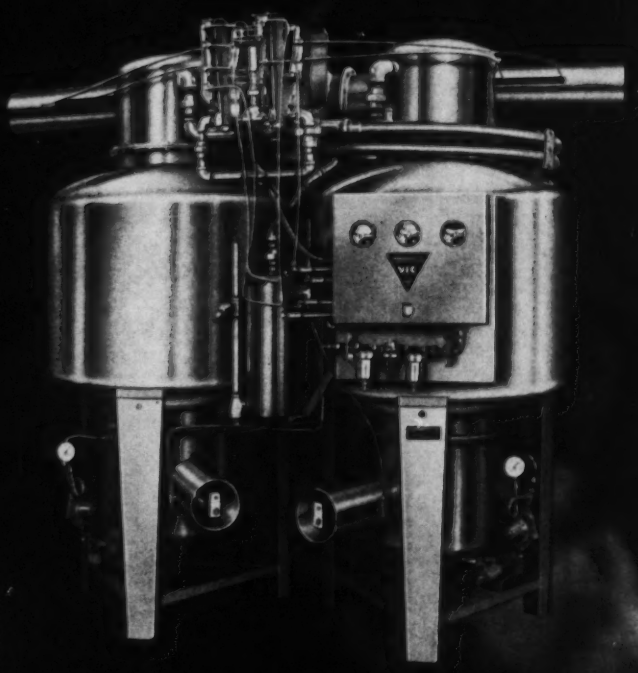
IMPROVE WORKING CONDITIONS—by preventing solvent vapors from entering working areas!

*Protected by one or more of the following patents: Pat. No. 2,480,320; 2,772,747; 2,760,594; 2,910,137. Canadian Pat. No. 470,085 and other Patents applied for in U.S. and Foreign Countries.



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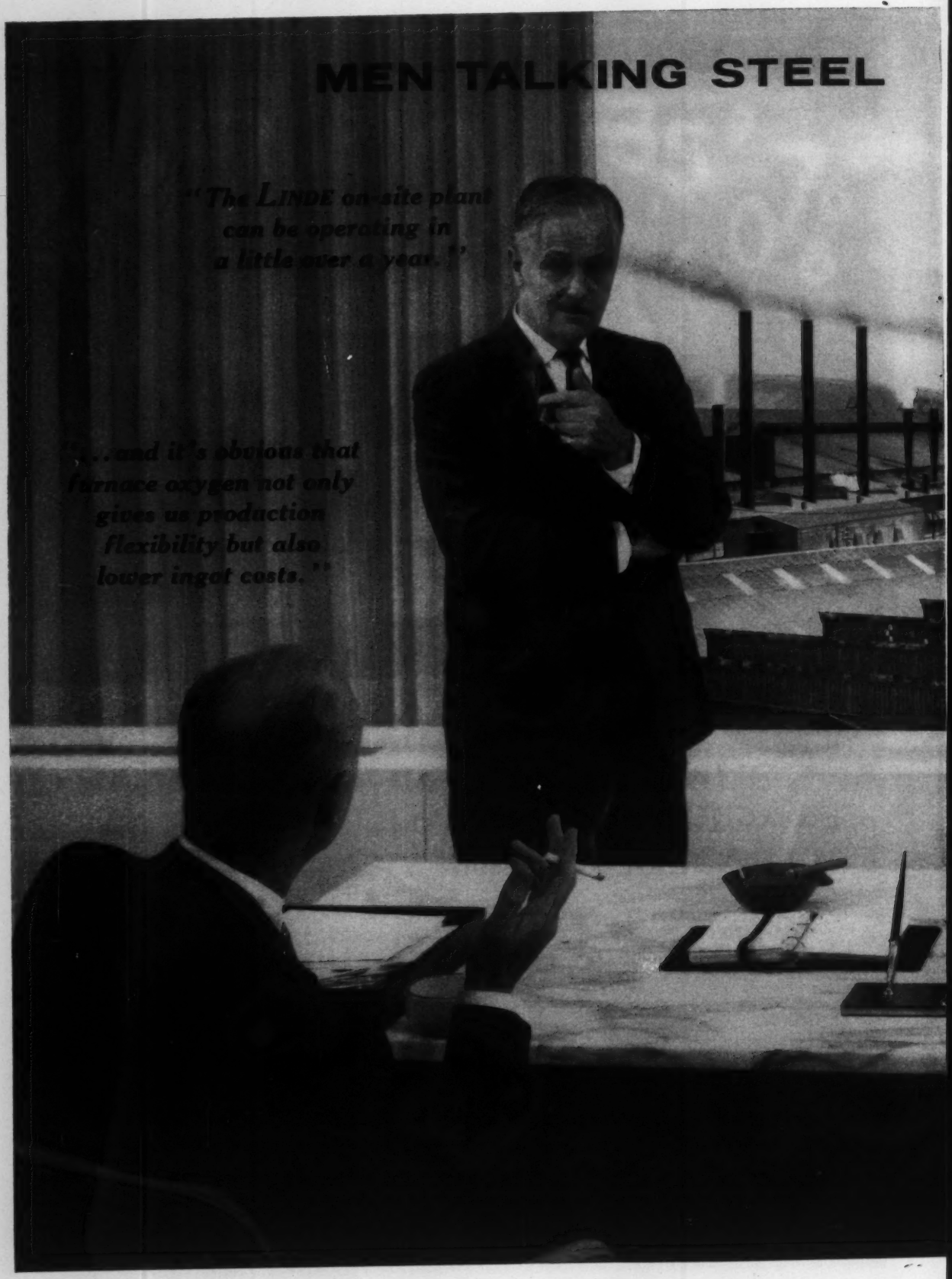
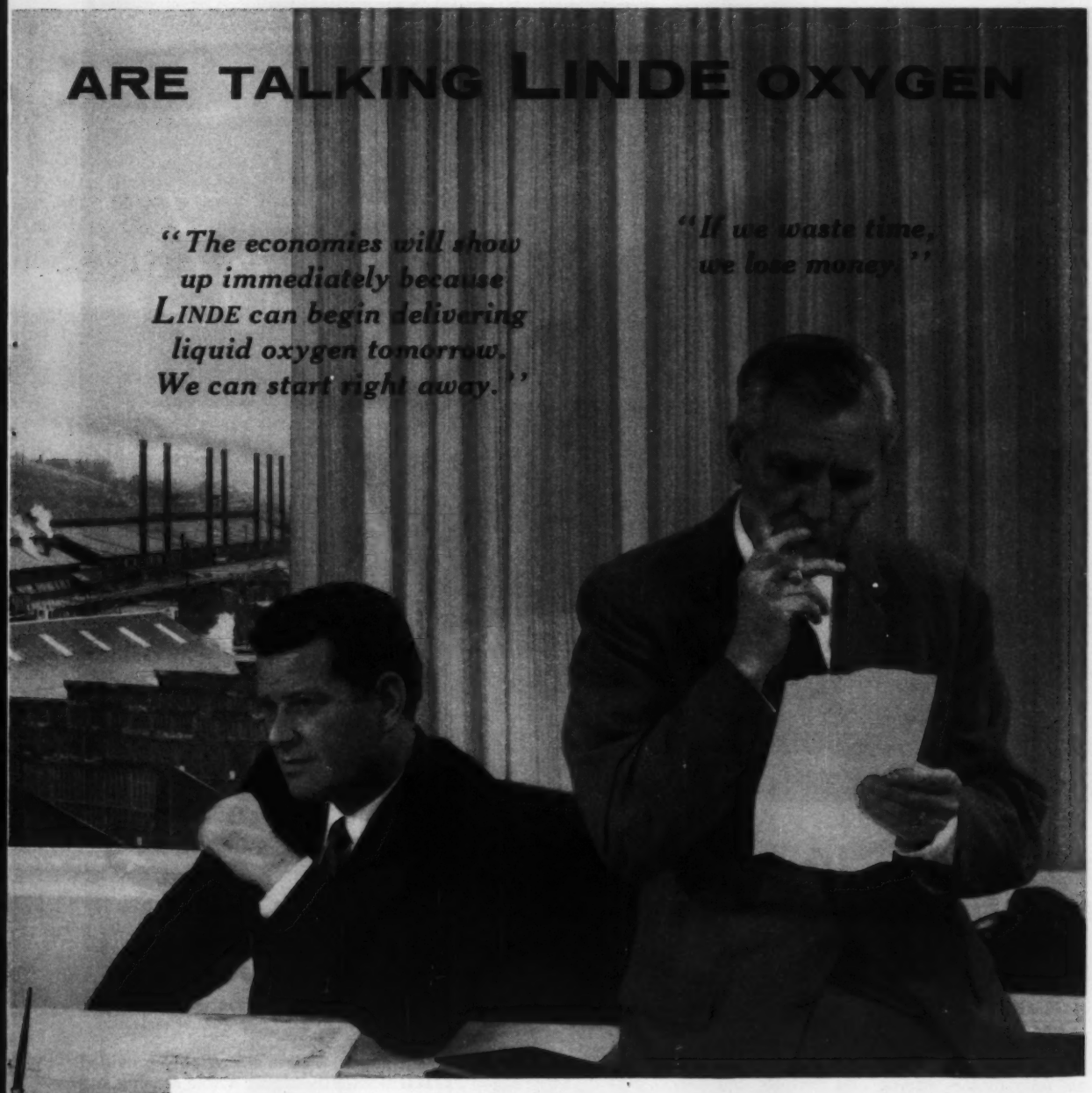

MEN TALKING STEEL
"The LINDE on-site plant can be operating in a little over a year."
"...and it's obvious that furnace oxygen not only gives us production flexibility but also lower ingot costs."

ARE TALKING LINDE OXYGEN


"The economies will show up immediately because LINDE can begin delivering liquid oxygen tomorrow. We can start right away."
"If we waste time, we lose money."

To get all the facts on how LINDE applies "*total gas technology*" to on-site oxygen plants for the steel industry, write Linde Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. *In Canada*, Linde Company, Division of Union Carbide Canada Limited, Toronto 12.

LINDE COMPANY

UNION CARBIDE

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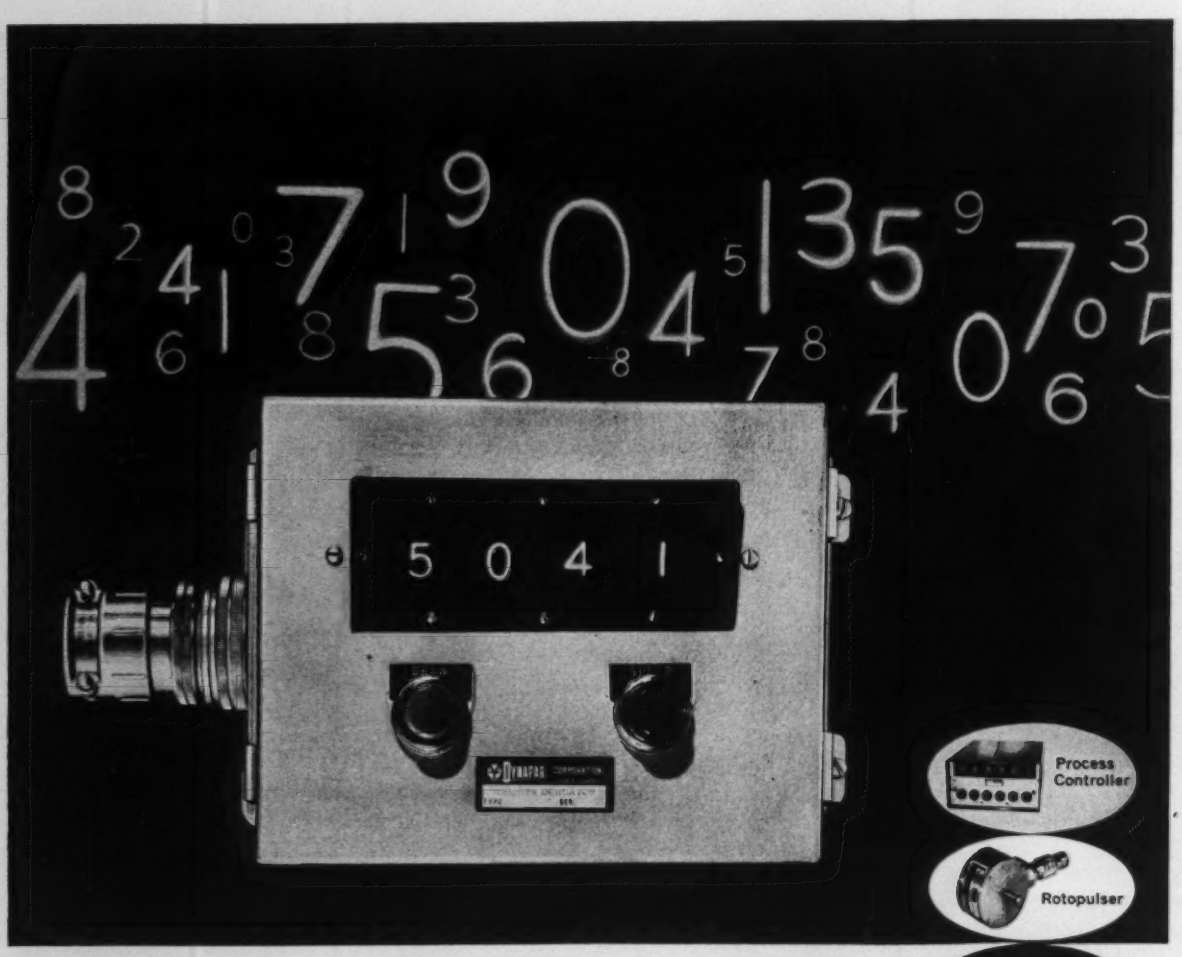

NOW...Louis Allis offers DYNAPAR* Digital Control Systems!

Louis Allis can supply accurate digital controls designed to industrial standards for a wide variety of continuous process lines

For any production process, Louis Allis can furnish not only motors, drives, and controls, but also digital monitoring equipment to provide visual readout and process control signals.

The answer is DYNAPAR Digital Control — a highly accurate digital logic system that can count, measure, totalize, indicate, time, or control depending on the requirements of the application. Digital systems are ideally suited for high speed counting — accurate measurement of speed and draw — automatic cutting-to-length — automatic positioning — and many other applications.

Dynapar's digital devices utilize precise pulses, and eliminate the drift inaccuracy inherent in magnitude-measuring analog systems. There's no need for constant calibration or adjustment. Pulses are reliably provided by rugged ROTOPULSERS, highly stable sensing and pulse generating devices—visual indication is obtained by easily-read luminous direct numerical readouts. Control functions are accomplished by a variety of special devices tailored to specific operations. All DYNAPAR equipment features the most modern solid-state transistorized circuitry to provide long-life operation without maintenance.

Investigate to see how Louis Allis-Dynapar equipment can increase production and cut waste by automating *your* process. Call your local Louis Allis District Office, or write to The Louis Allis Co., 471 E. Stewart Street Milwaukee 1, Wisconsin.

*Dynapar Corporation is the electronic subsidiary of The Louis Allis Co.

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McLOUTH STAINLESS STEEL

Test salt bath neutrality quicker with a razor blade

Liquid salt baths have long been recognized for their stability, freedom from decarb and the protection they afford the surface being treated.

Regardless of the inherent stability of molten salts, however, they do occasionally become contaminated which may result in decarburization. When this happens the metallurgist can use a simple homespun method to determine the bath's neutrality.

The hard way is a metallographic check, which involves cleaning, sectioning, mounting, polishing, etching and examining a specimen under the microscope. This is costly and time-consuming.

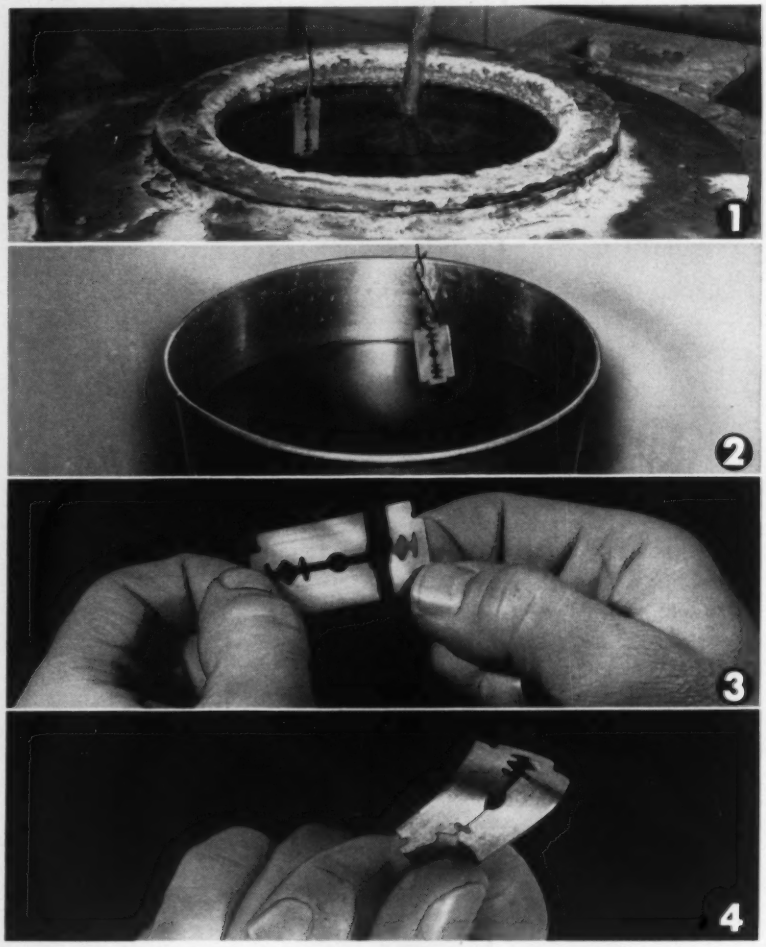
The simple way requires only an old razor blade, the double-edge type, and not one made of austenitic stainless steel. This method has been found very practical and accurate.

The blade is hung on a wire and dipped into the hardening bath of molten salt (photo no. 1), leaving it immersed for about the same time as the work being regularly heated there, and at the same temperature. Then it is quenched rapidly in water (photo no. 2).

Now for the simple bending and breaking test. Hold the blade in two hands and bend it. If it breaks with a brittle fracture (photo no. 3), the bath is neutral—no tendency to decarb. But if it bends before breaking (photo no. 4), this evidence of ductility indicates that the bath is decarburizing.

The ductility or absence of ductility indicates the condition of the salt bath. If the blade is ductile and can be bent 90° or 180° before fracturing, the steel is partially or completely decarburized. If the blade is not ductile but breaks with a brittle fracture, the bath is in good condition and work may be processed satisfactorily.

This simple test saves much time and the need for expensive metallographic equipment. It is not 100% sure, but our metallurgical friends find it very helpful for a quick and revealing test of the effect of molten salt on metal.



Heat treaters have come to expect the best from Houghton. And along with product purity, speedy delivery and well packaged materials "the best" includes assistance and cost-saving "hints" such as the razor blade test. Houghton makes and services salts for carburizing, hardening, annealing, tempering, quenching and nitriding. For the Salt Bath Catalog, write E. F. Houghton & Co., 303 W. Lehigh Avenue, Philadelphia 33, Pa.

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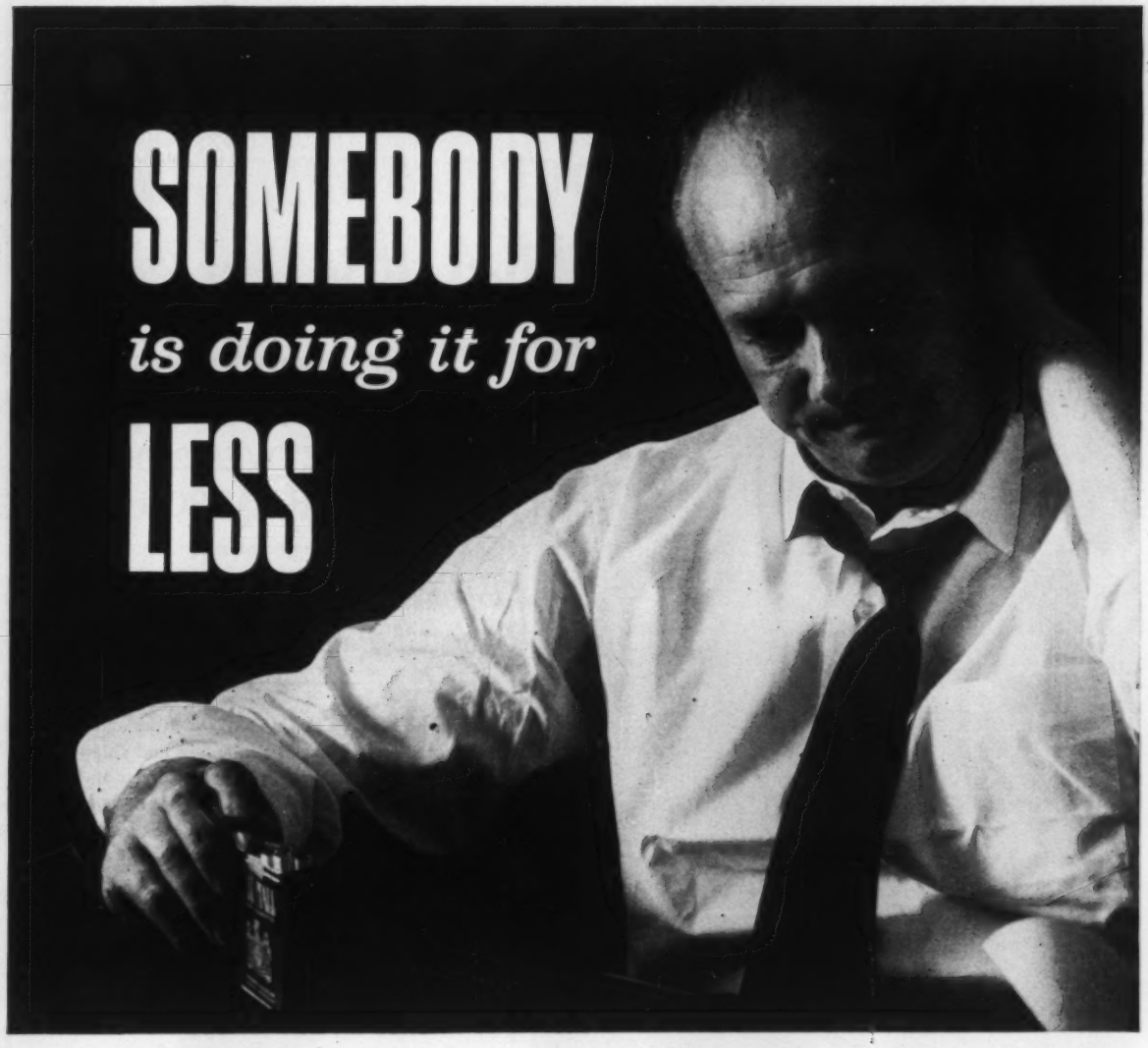
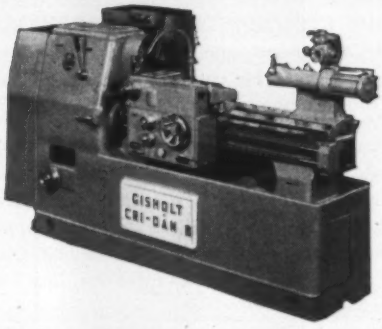
SOMEBODY *is doing it for* LESS





Gisholt CRI-DAN Model B Automatic Threading Lathe—Sets up in 8-15 minutes. Uses inexpensive single-point carbide tools to produce all types of internal and external threads: single- or multiple-start, coarse or fine, left- or right-hand, straight or tapered, standard or special form—in any material, including new high-tensile, hard alloys.

Optional accessories for the CRI-DAN B permit you to combine precision threading with tracing, turning, boring and facing cuts in one fast, automatic cycle. Other models are available. Call your Gisholt Representative or write for Catalog 1215.

While others are saving 30% to 80% with a new but proved threading technique, can you afford to stay with conventional methods?

With a Gisholt CRI-DAN High-Speed Threading Lathe, you can now use inexpensive single-point carbide tools to produce *quality* threads—simple or complex—*automatically*. A large number of progressive manufacturers (perhaps your toughest competitors) have found that the CRI-DAN technique cuts costs throughout the plant—with *direct* savings in initial costs, reduced threading times and tooling requirements—with *indirect* savings in tool inventory, materials-handling, floor space and planning.

Whether you're threading in lots of 6 or 600, the CRI-DAN technique will permit you to do it for less.

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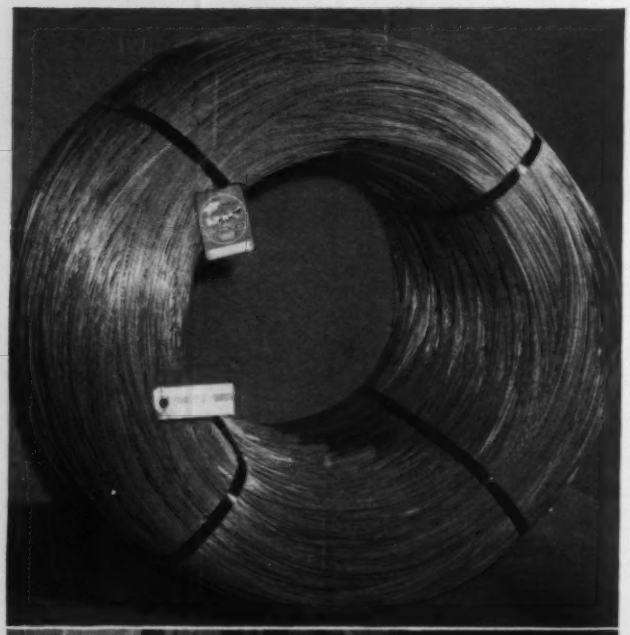
DSC-PORTSMOUTH "LAYER WRAPPED" LPR® COILS GIVE UPHOLSTERY SPRING MAKER OVER 40 MILES OF NON-STOP FABRICATING PER SETUP



LONG PRODUCTION RUN SNAG-PROOF COILS AVERAGE OVER 2200 LBS. .076″ HIGH CARBON WIRE

Improved "Layer Wrapping" Method Steps Up Fabricating Efficiency

DSC-PORTSMOUTH DIVISION, Rod and Wire Department, recently began producing and shipping .076″ Upholstery Spring Wire in Long-Production-Run coils averaging over 2200 pounds in weight and over 40 miles in continuous length. One of these coils is shown in the adjacent photograph.

LONG PRODUCTION RUN COILS are not new. For years we have been regularly producing LPR's weighing up to about 4200 pounds. But it is something like crashing a "New Frontier" to produce spring wire LPR's as light as .076″ in gauge and weighing over a ton — *and packaged in a way that virtually eliminates the chance of snagging or tangling in your pay-off operation.*

THIS CONTRIBUTION to WIREWORKING EFFICIENCY is one important result of *"layer wrapping" the strands as the big coils are built up.* This mill operation is shown in the lower photograph.

Would cost-reducing, Long-Production-Run, snag-proof coils fit into your brite wire fabricating picture? *For the complete story on LPR's and "layer wrapping", and answers to your questions regarding application, size-weight ranges and prices, call your DSC Customer "Rep" or write: Detroit Steel Corporation, Box 7508, Detroit 9, Michigan.*

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Meet with Success

An executive who had been in meetings with associates all day followed up by relieving his tensions with liquid refreshment. When he stepped into the crowded elevator at his hotel that evening, he found himself facing the rear of the lift, unable to turn around because of the press of people.

Embarrassed, he blurted: "I suppose you wonder why I called this meeting."

We have often wondered—especially about committee gatherings that are supposed to discuss plans and policy.

When the purpose and leadership are good, such meetings are useful, indeed essential for soundly considered company action. But too often, purpose and leadership are bad. Then those conclaves are a waste of time at best. At their worst, such meetings can stall action on a vital project and eventually put a whole corporation in the Deepfreeze.

Listen to Clarence B. Randall, former chairman of Inland Steel Co.: "Beset with doubt, torn with misgivings about whether to go ahead with the plan before him, the vacillating executive turns to a group of his associates . . . He really wants someone to make up his mind for him."

No group can or should make the decision. A gathering of associates should have an advisory nature only. It should be a forum for discussion by experienced people, to help the chairman reach a conclusion.

A successful advisory meeting has these five ingredients:

1. A good chairman. He genuinely opens his mind to the analysis of the facts by participants. He never relinquishes command. He knows when the discussion should end and his decision making should begin. He is orderly, crisp, disciplined.

2. The right people in quality and number. Ten is maximum. Don't have the nonstop talkers. Think twice about inviting anyone for diplomatic reasons.

3. An agenda. Circulate it in advance and stick to it.

4. Brevity. An hour is long enough for any conclave.

5. A summary. About 10 minutes before adjournment, the chairman should review all points made.

Excuse us now. We have to call a meeting.

John S. Morgan

ASSOCIATE MANAGING EDITOR

Get cost-cutting

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Call in your nearby independent fabricator . . .

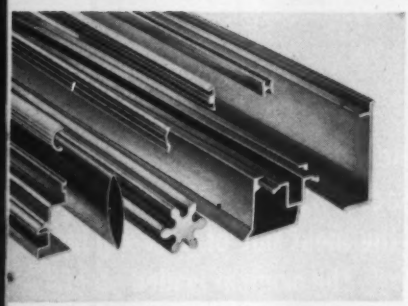
Supplied with quality ALCAN aluminum by Aluminium Limited

The practical everyday help you need in aluminum application may be just around the corner—at your nearby aluminum extruder.

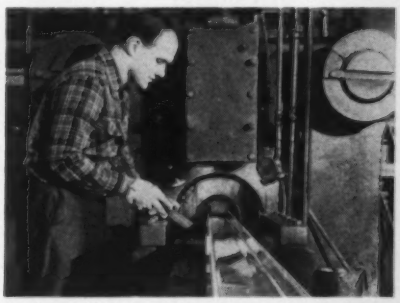
You'll find he's experienced! With knowledge gained through years of working with aluminum—he can help you design extruded shapes best suited to trouble-free production . . . peak end-product performance. He can help in alloy selection, too, offering you a wide variety of aluminum alloys formulated by Aluminium Limited.

Your independent aluminum extruder also offers more personalized service . . . your business is important to him. Even on small orders, he will give you the quality work, attention to detail and prompt delivery that assure your repeat orders.

Call in your aluminum fabricator on your next extrusion order. Let him estimate on cost and delivery. Or, if you prefer, we'll be pleased to send you a list of leading independent aluminum extruders in your area.



Any shape . . . the right alloy. Your nearby extruder can turn out aluminum in a wide range of shapes to meet your most exacting requirements. He also works with you in choosing from a variety of ALCAN aluminum alloys.



Modern equipment. Investigate the facilities offered by your aluminum fabricator—you'll find him well equipped to serve you. His facilities, experience, location, and his personalized service make him your best source of extruded aluminum products.

Fast, reliable delivery. Because he's nearer to your plant, your aluminum fabricator can arrange production schedules to suit your needs. He can also work more closely with you in estimating, planning and engineering.

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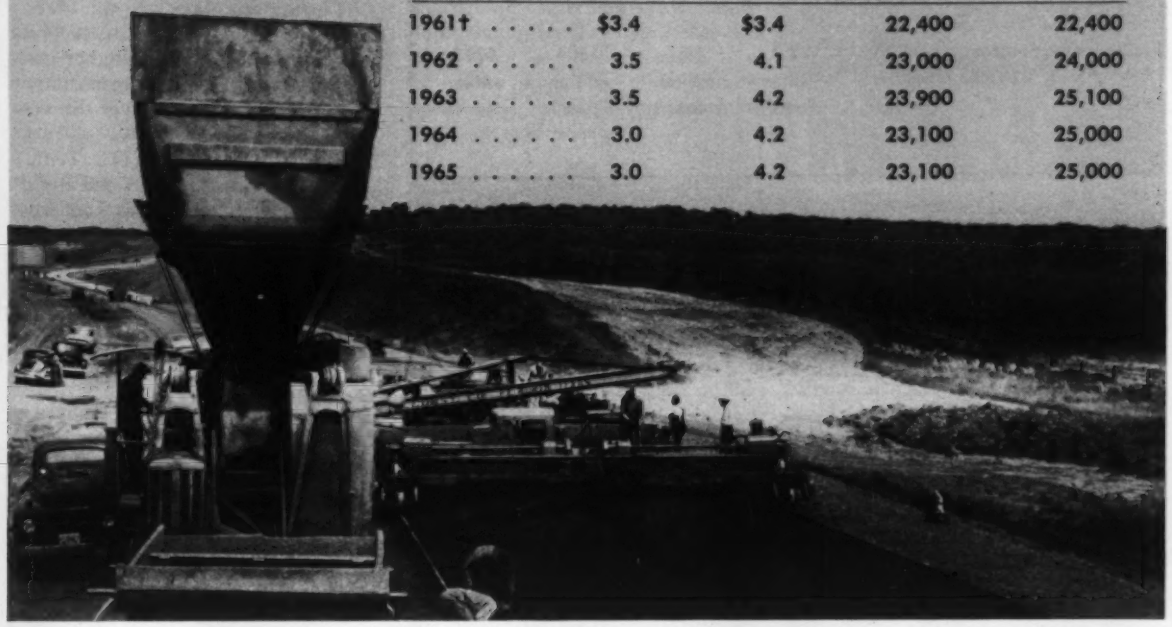
How Kennedy Proposes to Boost Highway Construction

Fiscal Year	Expenditures (Billions) Existing Program	Expenditures (Billions) Kennedy Proposal	Project Miles* Existing Program	Project Miles* Kennedy Proposal
1961†	$3.4	$3.4	22,400	22,400
1962	3.5	4.1	23,000	24,000
1963	3.5	4.2	23,900	25,100
1964	3.0	4.2	23,100	25,000
1965	3.0	4.2	23,100	25,000



*Project miles include all contracts—for example, grading and paving contracts. Hence: Project miles do not reflect actual highway miles of construction.
†Fiscal '61 ends June 30, and President Kennedy's proposal will have no effect on current program.

Financing Still Key to Road Program

METALWORKING'S STAKE in President Kennedy's proposed highway program is a big one.

Example: In the fiscal 1961-65 period (which began July 1, 1960) the steel industry would furnish 10.6 million tons of steel—the Kennedy plan (see exhibit) calls for an increase in federal spending of $3.7 billion in that period. If the present level of federal aid to the ABC (primary, secondary, and urban) road programs continues, steel sales will be about 8.4 million tons, estimates the Bureau of Public Roads (BPR).

• **Hearings Speed Up**—Tomorrow (Mar. 14) the House Ways & Means Committee starts hearings on the need to speed up the program. President Kennedy is asking for completion of the interstate system by 1972, as originally scheduled. He says the highway trust fund (which finances the program on a pay-as-you-go basis) needs at least $900 million more a year than it's getting.

To avoid a five year stretchout of the program, he wants Congress to:

• Continue the federal gasoline tax at 4 cents per gallon.

• Raise the diesel fuel tax to 7 cents a gallon (from 4 cents).

• Raise the truck tax (over 26,000 lb) to $5 per 1000 lb (from $1.50 per 1000 lb).

• Raise highway tire, inner tube, and tread rubber taxes to 10 cents per pound—they're now 8, 9, and 3 cents.

Acknowledging the difficulties of getting such tax boosts through the Congress, the President says that the same amount of revenue could be gained by putting the whole load on the automobile driver—by raising the gasoline tax to 4½ cents per gallon. He recommends the truck tax increase on the basis of a recent BPR study which reported that truck owners are not paying

What Proposed Boost in Road Building Means

(Materials, work required)

	Cement	Bitumens	Steel	Aggregates	Excavation
Existing Program (Fiscal '61-'65)	258.9 million tons	20.2 million tons	8.4 million tons	1524 million tons	6364 million cu yd
Kennedy Program (Fiscal '61-'65)	320.9 million tons	23.0 million tons	10.6 million tons	1804 million tons	8033 million cu yd

their full share of the highway program.

• **Controversy Looms**—Some of the President's recommendations are certain to be controversial in the Congress because they leave some revenues out of the trust fund: He does not want $800 million in automotive excise taxes transferred to the fund, and he does not want aviation fuel taxes in the highway fund. He proposes a little more burden on the fund by transferring the financing of forest and public land highways to it at a cost of $37.5 million a year. He notes that his new taxes would also cover an increase in the ABC program of $25 million a year every two years.

The President rejects other means of financing the federal program, such as bond issues, tolls, and loans from the U. S. Treasury, or dropping the trust fund concept and just financing the program from general revenues.

• **Industry Endorsements** — Industry reaction to the slowdown in the highway program was voiced at the Atlantic City, N. J., meeting of the American Road Builders Association last week. ARBA generally endorses President Kennedy's position.

Maj. Gen. (retired) Louis W. Prentise, executive vice president, noted that Congress must boost annual authorizations for the interstate system to $3.5 billion (from $2.2 billion for fiscal 1963) to get it on schedule.

Trucker reaction to the President's proposal: Higher truck taxes will eventually become higher consumer prices when transportation costs are increased to cover the new taxes.

Sen. Albert Gore (D., Tenn.) made a proposal at the Road Builders convention: Abolish the trust fund so that the program is not subject to the ups and downs of the revenue collections. He charged that a $1 billion ABC program is not sufficient. He believes adequate ABC roads are needed to feed the interstate system so that its benefits may be as great as possible. He warned that Congress must make the long term decision on financing this year, or there is not a chance the interstate system will be completed by 1972. Some 3000 miles of the 10,000 miles now completed are not up to the standards originally set, he said.

Construction Equipment Builders Optimistic

THE ADMINISTRATION'S road building program brightens the long range prospects of construction equipment makers. Outlook for the short term—the year ahead—is also encouraging.

Most equipment builders contacted at the American Road Builders Association meeting in Atlantic City, N. J., last week told STEEL they felt that 1961 sales will top last year's $1.6 billion.

Harry Broadwell, regional sales manager, International Harvester Co., said he feels the upturn will come in April. He stated flatly that his firm's inventories of finished products are down as far as they can go. "When a retail sale is made, a factory sale is sure to follow."

• **Upturn Is Certain** — Clarence Killebrew, vice president, Clark Equipment Co., says that an upturn for his company is certain. He expects volume to return to the 1959 level (1960 was off slightly from that). Clark recently raised prices on construction equipment about 5 per cent across the board—the first increase in two years.

"We see signs of the heavier, custom built equipment sales rising," relates Boyd E. Oberlink, senior vice president, Allis-Chalmers Mfg. Co. "Although the standard equipment sales haven't made the same upturn, they're sure to follow."

A-C's factory shipments dropped 20 per cent last year, while dealer sales fell only 6 per cent. Now that dealer inventory adjustments have been made, A-C expects factory sales to rise 15 to 20 per cent this year over 1960's.

• **Best Month**—Chain Belt Co. says that January was its best sales month in three years and that the trend carried over into February.

Euclid Div. (Cleveland) of General Motors Corp. reports that new orders are coming in better than they did last year at this time, but it's too early to draw any conclusions about where business will go. One indicator: Last month, the division recalled 400 workers.

Tool Builder Sets Up New Trade-in Plan

TAKING A PAGE from consumer product marketing techniques, Pratt & Whitney Co., Inc., West Hartford, Conn., will give customers trade-in allowances.

Paul N. Stanton, vice president-marketing, says a new branch of the company will accept used or surplus machine tools of any make as part payment toward the purchase of new P&W products.

• **A Need**—Mr. Stanton says: "For too long, machine tool builders have ignored the needs of their customers to dispose of surplus machinery when buying new equipment." The new program is set up to help customers by providing a "one-stop service" for machine tools.

Mr. Stanton points out that machines not suited to the production requirements of one manufacturer may be needed in the plant of another. The trade-ins will be rebuilt, then offered to companies that have only a limited amount of capital or encounter other circumstances that make it impractical to buy new equipment.

• **New Subsidiary** — Emphasizing that P&W will not be in the used machinery business, Mr. Stanton reports the parent company, Fairbanks Whitney Corp., has established the Machinery Trading Corp. to handle the trade-ins. It will have all the facilities to receive, recondition, warehouse, and sell the used machines.

Paul N. Stanton

Rise in Capital Spending Due in Fall

BUSINESS SPENDING for new plant and equipment should turn up in the last half, reversing a decline that started in the third quarter of 1960. A survey, conducted in January and February by the Securities & Exchange Commission and the Department of Commerce, shows that total expenditures in 1961 will fall only 3 per cent below 1960's to $34.6 billion. That is in contrast with the 17 per cent drop in 1958 (vs. 1957), which intensified the 1958 recession.

• **What They'll Spend** — Durable goods industries expect a 7 per cent reduction in outlays, and makers of nondurables anticipate a small gain.

Iron and steel companies will spend $1.22 billion in 1961, 25 per cent under 1960's; capital goods spending in nonferrous metals will stay at $0.31 billion; electrical machinery and equipment makers will spend slightly more, hitting $0.71 billion; outlays in machinery, except electrical, will be up slightly to $1.13 billion; motor vehicle and equipment companies will spend $1.03 billion, up 15 per cent; transportation equipment makers, except autos, will keep spending at the 1960 level, $0.42 billion.

Public utilities, which anticipate a 7 per cent rise in sales, are the only major industry group (see table), planning substantially higher outlays, 10 per cent over last year's.

• **Sales Expectations**—Manufacturers covered in the federal survey predict 1961 sales will rise 3 per cent. Durable goods producers expect a 2 per cent sales increase; only auto and steel companies foresee lower shipments.

How '61 Will Compare with Last Year

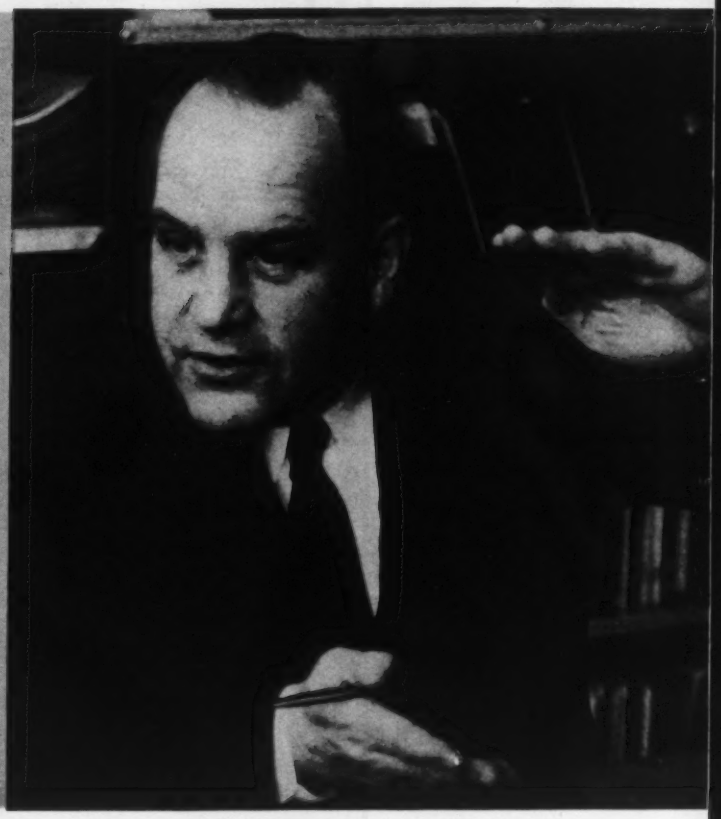
(Billions of dollars)

	Actual 1960	Anticipated 1961	Percentage Change
Manufacturing	$14.48	$14.11	− 3
Durable Goods	7.18	6.69	− 7
Nondurable Goods	7.30	7.42	+ 2
Mining	0.99	0.98	− 1
Railroad	1.03	0.60	−42
Transportation, except Rail	1.94	1.85	− 5
Public Utilities	5.68	6.22	+10
Commercial & other	11.57	10.81	− 7
TOTALS	$35.68	$34.57	− 3

Source: Commerce Department.

"We tried low price once . . . it didn't boost sales," says H. Thomas Hallowell Jr. Here's how he and other . . .

Fastener Makers Are Fighting Back



FEW INDUSTRIES have been buffeted harder by competition (domestic and foreign) or the recession than the fastener industry. Sales last year fell 20 to 25 per cent below 1959 levels, says George P. Byrne Jr., managing director of six trade associations in the industry.

Most fastener makers see encouraging signs of an upturn: Government spending is climbing; some industries are reportedly increasing orders (farm and earth moving equipment are two); and distributor inventories are believed to be touching bottom.

Another plus factor: A new aggressiveness in the industry. Company executives are taking a second look at price fighting; they are also dropping unprofitable items, developing new products, investigating new materials, and strengthening marketing approaches.

● **Price Fighting**—"We experimented with a low price," relates H. Thomas Hallowell Jr., president, Standard Pressed Steel Co., Jenkintown, Pa. "We didn't sell any more than we had at the higher price. For example, I asked one customer—a terrific price buyer—if he would give us all his business if we gave him the low price. He wouldn't do it."

Except for a few lines, like hexhead bolts and cap screws, Standard Pressed Steel officials don't believe that unreasonable price competition is widespread. Foreign competition is as responsible for the price fighting as any factor, laments one Midwest producer. Imports of industrial fasteners have risen 600 per cent since 1952. Major sources are Japan, Germany, Belgium, Sweden, Italy, and the United Kingdom.

● **Better Marketing**—Special fastener producers are working more closely with customers on the "in-place costs," says Frank Masterson, president, Industrial Fasteners Institute. "They're trying to convince customers that they should be looking at ways to save dollars on assembled costs of products rather than pennies (via) the lowest per pound fastener cost."

Example: Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y., is demonstrating to customers how two high strength bolts can do the work of three regular bolts and save money.

RB&W and others are hammering away at standardization of types and sizes of fasteners throughout a company's product line as a potential area for cost cutting.

There's more money to be made in special fastener markets, most industry sales managers believe, and alert sales personnel are often able to spot sales potential for the same special in two markets. Burlen Mahn, sales manager, Reed & Prince Mfg. Co., Worcester, Mass., reports his firm found the boating industry a good market for a special that used to go to the aircraft industry.

● **New Products & Materials**—This effort offers the most promise for

new business, many industry executives feel. Although an estimated 90 per cent of all fasteners are made of steel, increases in the use of aluminum, copper alloys, beryllium, titanium, and plastics are being chalked up steadily.

Richard Ladner, manager of fastener and screw machine product sales, Aluminum Co. of America, feels that architecture, transportation, and consumer products are areas in which aluminum will show gains this year. Reason: More sophistication in cold heading techniques.

Standard Pressed Steel has developed a new beryllium shear bolt for the space and missile market. "Pound for pound, the new bolt is nearly twice as strong as the best comparable steel superbolts," officials claim.

SPS has also developed an automated machine capable of driving 2500 socket setscrews per hour and a new method of encasing electronic semiconductors without the use of heat.

Industrial Nut Corp., Sandusky, Ohio, had been producing a snap ring from cold drawn tubing. It had to be machined for two diameters and slotted on a milling machine after heat treatment. The firm was able to cut its price from $25 to $15 per hundred parts by switching to an extruded section, cutting to length, forming to a round section, and heat treating.

RB&W operates a subsidiary, Industrial Plastic Molders Inc., Hialeah, Fla., which produces plastic plugs and lock nuts. Markets include compressors, pumps, meters, valves, plus hydraulic and pneumatic devices.

• **Miniaturization**—This trend has hit the fastener industry too, especially in aircraft and missile applications. Says Thomas C. Baumgartner, SPS development laboratories supervisor: People are becoming compact conscious, so bolts have to be smaller and stronger. With more holding power and higher fatigue values packed into smaller fasteners, entire assemblies can be made stronger, lighter, and more compact.

• **Even Exports**—Despite all the complaints about imports, a few firms have been able to develop some export business. Two Eastern firms, for example, report a steady increase in foreign business. Chief reason: "For the products involved, foreign companies are running several months behind in deliveries."

How Five Fastener Makers Size Up Business

Standard Pressed Steel Co.
First half sales will run at same level as all of 1960's . . . second half will turn up . . . 1961 as a whole will top last year.

Chicago Screw Co.
Our sales in 1960 were down 6 per cent from 1959's. Right now, sales are good . . . farm implement and earth moving equipment makers are buying . . . distributors are replenishing inventories.

Russell, Burdsall & Ward Bolt & Nut Co.
Since June 30, 1960, there's been a definite dropoff in sales . . . we hope by spring there will be some pickup . . . there are no signs yet.

Tru-Fit Screw Products Corp.
A 10 to 15 per cent increase for 1961 has been forecast . . . profits on standard products may fall 8 to 10 per cent.

Parker-Kalon Div., General American Transportation Corp.
We're operating at the same rate as the last quarter of 1960 and will continue this rate through second quarter . . . third and fourth quarters look better . . . we should be up 8 per cent this year over 1960.

Special Metal Pinch May Come in Sixties

SOME SHORTAGES of specialty metals may be in store for metalworkers in the 1960s, predicts Ronald R. McNaughton, new president of American Institute of Mining, Metallurgical & Petroleum Engineers.

Over half the Free World's silver production is used by industry. While production is decreasing, demands from industry and the government (for monetary uses) are increasing. One authority estimates that treasury free stocks will be exhausted this year. Result: An increase in price.

Demand for tellurium is expected to exceed supply because of rapid advances in thermoelectric devices.

Progress made in that field has stirred up interest in other electronic materials like silicon, gallium, indium, and rhenium, points out Mr. McNaughton, who is metallurgical division manager for Consolidated Mining & Smelting Co. of Canada.

Political and military influences cloud the future of the uranium industry, and the outlook for rapid growth of civilian demand is not too optimistic, he says. However, the spectacular expansion of world energy requirements augurs well for the eventual growth of uranium and other nuclear metals like zirconium, hafnium, and thorium.

Experts See Depreciation Reform Coming

- They think President Kennedy "is likely to push strongly" for reform.
- They believe labor union opposition "is mostly shadowboxing."
- They call the tax credit plan, favored by the administration's tax task force, "unworkable and discriminatory."
- They say depreciation reform could lead to a $6 billion boost in industry's annual equipment spending.
- They say depreciation reform would help to halt inflation.
- They see depreciation reform as a major weapon in the battle for world markets.

DEPRECIATION REFORM is coming. And it will bring about a tremendous upsurge in industry's investment in new equipment.

That's the firm belief of two of the nation's foremost authorities on depreciation policies—Rev. William T. Hogan, S. J., director of Fordham University's Industrial Economics Program, and Maurice E. Peloubet, senior partner of Pogson, Peloubet & Co., New York accounting firm.

• **Outlook**—The Kennedy administration "is likely to push strongly for a sound depreciation reform program," Mr. Peloubet asserts. He says labor union opposition to reform "is mostly shadowboxing." The unions will not vigorously oppose something the administration favors and take the chance of getting beat, he says. He believes the unions will try to trade depreciation reform for some item they want badly.

• **Big Gains**—The U. S. is investing about 4 per cent of its gross national product in new machinery and equipment, while such foreign industrial powers as West Germany, Japan, and Belgium are spending 8 to 10 per cent of their GNP.

Father Hogan tells STEEL that sound changes in our depreciation laws can reasonably lead to our investing 6 per cent or more of GNP in new equipment. Mr. Peloubet adds that industry will boost its annual spending for equipment by at least $6 billion if a realistic reform bill is enacted.

• **Tax Credit Plan**—Both experts brand the "tax credit plan," favored by the administration's tax study task force, as "unworkable and discriminatory."

The plan, as reported unofficially by the Washington *Star*, "would encourage expansion when our need is to encourage replacement," Mr. Peloubet asserts.

As reported, the plan would permit a taxpayer to reduce his tax by a credit of 20 per cent, or some other specified amount, of his expenditures for depreciable property in excess of the depreciation now allowed him. The credit reportedly would not affect the basis for future depreciation.

For a firm taxed at 52 per cent, this credit would be the equivalent of a deduction of approximately 38 per cent, Mr. Peloubet points out. For example, assume the expenditure exceeded depreciation by $100. The tax normally would be $52. That would be reduced by 20 per cent, or $20, so the tax would be only $32. About $62 income would be needed to produce that amount of tax.

Mr. Peloubet says this would be a temporary measure and that it "has no particular relation to depreciation reform." He points out that reports on the tax credit plan may not be full or accurate, but that if they are, "the method would discriminate sharply against users of the accelerated methods of depreciation under the 1954 act, if the taxpayer had a substantial part of his property depreciated on those methods and was at the beginning of the cycle." At the end of the cycle, Mr. Peloubet notes, the discrimination would be in favor of the user of the accelerated rates and against the firm using the straight line method.

He lists other defects of the plan:

1. It would favor the well financed taxpayer since it is based on expenditures in excess of ordinary depreciation.
2. It would impose "harsh and difficult requirements" on the small businessman since it states that the amount depreciated must be spent first. Small businesses usually can't raise funds as easily as large firms.
3. It discriminates heavily in favor of the taxpayer with the smallest depreciation allowances.
4. Its revenue impact might be twice as heavy as proposed methods of real depreciation reform.
5. Its uncertain impact would cause many firms to hesitate before

beginning a substantial replacement program.

• **What's Needed**—Says Mr. Peloubet: "We should be careful to distinguish between incentives for expansion and depreciation reform. Incentives to expansion, when required and properly administered, are of great value in an emergency. They are usually temporary and directed to particular segments of the economy. While incentives such as a large writeoff in the first year or a tax credit as a reward for investment may be useful in some circumstances, they are not a substitute for depreciation reform."

Mr. Peloubet says that bills introduced in the present Congress "go no farther than to attempt to correct some of the deficiencies and inadequacies of the depreciation deduction as administered at present."

He says the reinvestment depreciation bills, introduced by Rep. Eugene Keogh (D., N. Y.), and by Sen. Vance Hartke (D., Ind.) are intended "merely to compensate in arrears for the insufficiencies of depreciation calculated on original cost rather than current values." He says the bill introduced by Sen. George Smathers (D., Fla.) and the companion bill introduced in the House by Representative Keogh "merely attempt to provide a means whereby more realistic economic lives of machinery and equipment may be used by taxpayers." (Charts below show the effect these bills would have.)

None of those proposals is intended to encourage expansion. Their purpose is to provide sufficient depreciation to maintain current investment.

• **Cost**—Says Mr. Peloubet: "Rather loose statements about the loss of revenue involved in depreciation reform are frequently made. The experience of Canada shows conclusively that increased depreciation permitted under liberalized depreciation rates and methods does not decrease the revenue of the government."

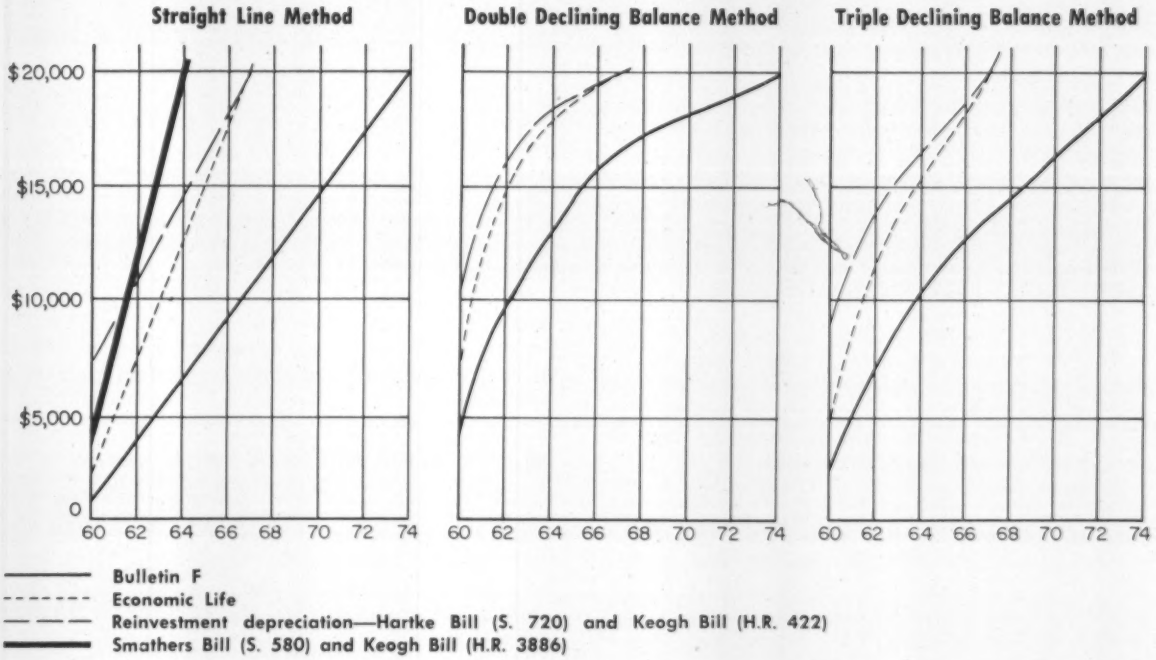
• **Conflict on Methods**—Mr. Peloubet thinks the disagreement in industry involving the types of plans wanted has been exaggerated. He believes "any advocate of replacement depreciation would be glad to support legislation for shortening lives" and vice versa. "There is no basic disagreement," he says.

• **Priest's Proposal**—Father Hogan says: "A method must be worked out by which enough depreciation can be charged off before taxes to allow the investor to recover the purchasing power of the dollars represented in his original investment." To do that, Father Hogan suggests that plant and equipment be revaluated annually by means of a cost or price index. It would recognize inflation (or deflation) and allow a firm to write off the true cost of capital consumption.

He says: "Today, we're faced with inflation, and the difficulty is precisely that we are not recognizing the full cost of capital consumption." He points out that a $1 million investment in 1939 written off at 5 per cent a year for 20 years yields $50,000 annually. But the $50,000 charged off in 1958 is worth only half the $50,000 charged off in 1939. So really only 2.5 per cent was charged off in 1958.

Father Hogan adds: "The reclamation of the purchasing power of the original investment should provide most of the capital needed for replacement of plant and equipment. Modern equipment will in turn increase production and productivity and thus provide a check against inflation by making it possible to contain or reduce prices."

Results of Various Methods of Depreciating Equipment Purchased for $20,000 in '60



Why the Administration Backed Down on the Machine Tool Sale to Russia... More Tools for Underdeveloped Nations?

THE FUROR behind the cancellation of Bryant Chucking Grinder Co.'s $1.5 million sale of grinding machines to the Russians (STEEL, Mar. 6, p. 38) is mostly political.

Here's why. The Kennedy administration regards trade with the Soviets as a good tool for solving the cold war. It's also aware of the need for domestic firms to expand foreign trade. Another factor: Why withhold trade on items the Reds can buy elsewhere in the world anyway?

The pressure on the administration to cancel the order for the miniature ball bearing production equipment was led by Sen. Thomas Dodd (D., Conn.). The move is considered the first major step by conservatives to forestall U. S. recognition of Red China.

Behind the administration's decision to back down on the sale is a desire to avoid any fight with Congress at this time. Trade with Russia is certainly secondary to the administration's antirecession programs.

● **WHAT'S NEXT?**—A full scale investigation of the Soviet trade question is probable. With all the publicity that'll accompany it, U. S. firms will probably shy away from trade with Russia until President Kennedy comes forth with a clearcut statement.

Meanwhile, what's the Defense Department going to do with the machines it buys from the Vermont tool builder? The equipment needs only testing, painting, and similar final steps for completion.

The government doesn't need this type of equipment—it would have similar machines on order if it did. Also, the export license limited the spindle speed to a maximum of 75,000 rpm compared with the 120,000 to 150,000 rpm on similar machines in this country.

Negotiations between the Defense Department and Bryant begin this week.

'Tool Bank' Plan Gets Attention

SOME HIGH government support is being voiced for a plan designed to send more machine tools and industrial equipment to underdeveloped countries, while offering incentives to U. S. industry to modernize its plants. At the same time, the government's huge inventory of tools may also be modernized.

Assistant Secretary of State George Ball is concerned about our inability to get more and better tools to needy countries via the International Cooperation Administration. He has been checking with government agencies concerned with surplus tools.

ICA says surplus tool disposal isn't systematic: Tools come in driblets; the agency lacks any real knowledge of what is available. There is hope that an interagency task force will look into the situation and make recommendations for action. President Kennedy has often voiced a desire that U. S. industry modernize its own equipment, so a plan something like that of Rep. Frank Kowalski (D., Conn.) may stand a chance of approval.

● **THE KOWALSKI PLAN**—The congressman describes his "Developmental Machinery & Tool Bank" as a "double barrel approach to stimulate U. S. business activity and help equip the developing nations." Assets for the bank would come from U. S. government surplus tools or obsolete industry tools. Industry would receive "appropriate incentives" to turn in tools to the bank: Accelerated depreciation, tax allowances, or credits on the purchase of new tools to replace the tools turned into the bank.

Underdeveloped nations would receive the tools at no charge from the centralized inventory of the tool bank. The scheme could also work this way: An American industrialist could come to the bank proposing to turn in his whole plant. A deal would be set up on that part of the equipment for which the bank had already received requests from underdeveloped countries.

● **NEEDS INDUSTRY SUPPORT** — Representative Kowalski admits he will need plenty of support to get his plan accepted. He's talking to top State Department officials. The Commerce Department and ICA are studying the tool bank plan.

Several trade associations and government agencies favor increasing shipments of obsolete tools overseas, especially from government sources to avoid having them sold on the U. S. market and depressing the industry here.

It's emphasized too that machines considered obsolete by U. S. standards may be better suited to the current needs and state of development of nations in Africa and Asia than the most modern U. S. tools available.

● **U. S. TOOL NEEDS**—Whatever happens to the Kowalski plan, the Office of Civil & Defense Mobilization has moved to get more money to modernize the government's tool stock. The Bureau of the Budget has been requested to "explore the desirability" of instructing all agencies owning tools to replace them "where substantial savings can be realized" by using modern tools.

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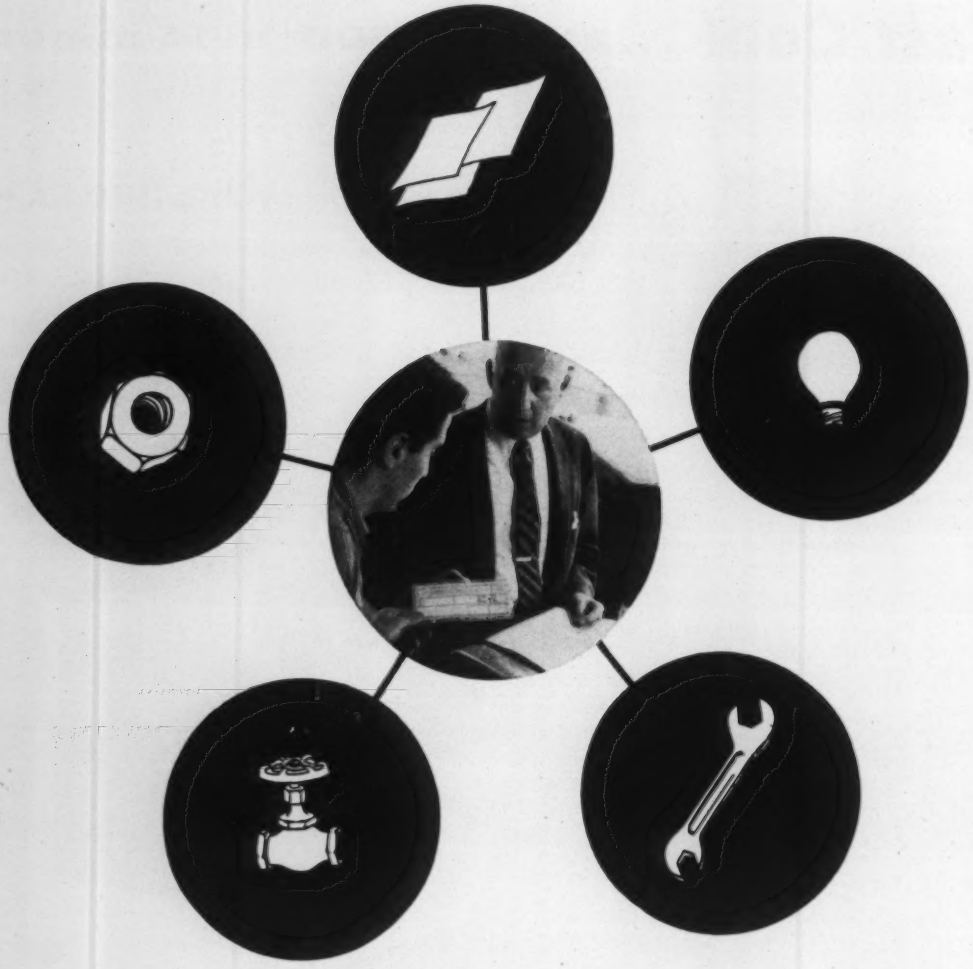

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PROFIT GROWTH

Our Challenge in World Markets

IN THE ECONOMIC RACE among nations, the U. S. is like an elephant pitted against a pack of greyhounds. We're bigger and stronger, but they're faster and more agile. We had an impressive head start, so they're not likely to catch us. But the fierceness of their rivalry will narrow the gap. It's already happening.

Industry's reaction to this new, intense competition for world markets has been varied. Some managers pretend it doesn't exist. Others are running scared, shouting that we must hike tariffs or die. Fortunately, most managers put the factors in proper perspective.

We're Still Tops

The U. S. remains supreme in the industrial arena. With about 6 per cent of the world's land area and little more than 6 per cent of the world's population, we have 65 per cent of the world's passenger cars, more than half the telephones, 40 per cent of the radios, and 45 per cent of the farm tractors. We produce more than one-third of the world's electrical power, nearly 30 per cent of the steel, and about 17

We're Richest Nation . . .

Per Capita Gross National Product

(For 1959 in U. S. dollars)

U. S.	$2,762
Canada	2,036
Sweden	1,631
Switzerland	1,538
Belgium	1,276
Great Britain	1,252
France	1,131
West Germany	1,131
Netherlands	895
Italy	547
Japan	345

But We Lag in Selling the World . . .

Per Capita Exports

(For 1959 in U. S. dollars)

Belgium	$362
Canada	321
Netherlands	316
Switzerland	307
Sweden	293
West Germany	187
Great Britain	186
France	124
U. S.	98
Italy	57
Japan	37

per cent of the milk. The average American is better paid, better fed, better housed, better clothed, and better entertained than his counterpart anywhere else in the world.

But we dare not let that impressive record lull us into a suicidal state of complacency. While the U. S. is still in first place, more than a dozen other nations are threatening the security of our position. Manufacturing output in Japan, for example, is running at about triple the 1953 rate. Our status in the hierarchy of nations is deteriorating. We no longer enjoy the immense lead we once had.

The greyhounds have started to catch up with the elephant.

Our Lead Is Shorter

Ten years ago, the U. S. was the world's major source of goods and money. Our gold reserves totaled $33 billion. We were the acknowledged center of technological development, of product design, and of advances in marketing.

Our gold reserves have dwindled to less than $18 billion. Japan, West Germany, Italy, and other countries—even Russia—are threatening our superiority in technology, design, and marketing. Foreign production facilities and techniques are in most cases as good as ours. Some are better.

U. S. imports have jumped from $12.6 billion in 1956 to around $15 billion in each of the last two years. They're likely to rise slightly this year. U. S. merchandise exports fell from $17.3 billion in 1956 to $16.3 billion in 1959, then jumped to $19.5 billion last year. They are likely to fall slightly in 1961. We still have a favorable balance of trade, but we have fallen far short of our export potential.

Exports make up only about 4 per cent of our gross national product. The figure is better than 10 per cent for France, Japan, Italy, West Germany, and the United Kingdom. For Belgium, it's about 25 per cent, for Luxembourg, more than 80 per cent. We're far from meeting our potential as a world trader.

• **Exports Are Vital**—While accounting for only 4 per cent of our GNP, merchandise exports are vital to many U. S. metalworking industries. They account for one-fifth our output of machine tools and trucks, nearly one-third our output of civilian aircraft and construction and mining machinery.

• **So Are Imports**—We could not maintain our unique standard of living without imports. We urgently need such imports as iron ore, pulp, and scores of other materials. Without imports, for example, few of us could afford a telephone—which consists of 48 different materials from 18 countries.

• **Need More Trade** — We must import; we must export. And as long as we continue our vast foreign aid program, we must export considerably more than we import —or the resulting deficit in our balance of payments could eventually lead to currency devaluation. Last year, for example, our exports of merchandise exceeded our imports by more than $4 billion. Add services, and we had a favorable balance of trade estimated at $5.8 billion. But we suffered a payment deficit of $3.8 billion. The reason: Our net outflow of private investments, military expenditures abroad, government grants, loans,

and credits, and other transactions totaled nearly $10 billion.

That situation — sending more dollars abroad than the amount of foreign currency paid to us—has resulted in an excess of dollars in some foreign lands. Those dollars have been exchanged for our gold at an increasing rate. The result: Our gold reserves are at their lowest point in more than two decades.

What to Do

Our serious problem has a reverse side called outstanding opportunity. Markets outside the U. S. are growing rapidly. The key to raising our own rate of growth—in output and in profits—is to share in the expanding markets abroad.

The population of the world is exploding at an astounding rate. The net increase in humanity during the nine month gestation period which ends today would populate New York, Chicago, Philadelphia, Los Angeles, Detroit, Baltimore, St. Louis, Boston, Cleveland, Washington, Pittsburgh, San Francisco, Milwaukee, Houston, and Cincinnati, plus some hamlets.

Supplying the growing mass of people outside our country can be a highly profitable operation—as many aggressive metalworking companies have already discovered. Gillette Co., for example, last year brought into the U. S., before U. S. taxes, $17 million in profits from foreign operations. Caterpillar Tractor Co. increased foreign sales by 21 per cent last year—offsetting a decline in domestic volume. The firm now gets 48 per cent of its volume abroad (vs. 30 per cent in 1955).

And you don't have to be big to take advantage of the burgeoning world market. A one man firm in North Carolina ships semiautomatic collating machines into 20 foreign countries, the Small Business Administration reports. In a recent survey of 40 U. S. firms, SBA found that one-third had percentage returns on foreign operations more than double that in the U. S.

You don't need secret weapons to crack foreign markets. Your success there will come from emphasizing those things which gave U. S. industry its dominant status in the first place—competitive pricing, high quality, functional designs that suit the tastes and needs of the customers, and rapid introduction of new products and processes.

But, of course, those benefits aren't easily achieved, as the high rate of business failures in this country will testify. Still, the more than 12,000 U. S. firms that are doing business abroad—and their countless suppliers—have proved that courting the world can be a mighty profitable venture—and a key to growth.

Listen to Stanley C. Allyn, chairman, National Cash Register Co. (which gets 40 per cent of its sales volume abroad): "Companies which have achieved success in overseas trade have developed definite philosophies of doing business abroad . . ." He lists eight principles:

1. When you go into a country, go in for keeps.
2. Staff foreign operations with nationals. (NCR has ten Americans among 25,000 employees overseas.)
3. Consistently invest part of your profits in the country where they are earned.
4. Treat overseas employees exactly as you do your people at home.
5. Give the foreign market the product it wants—not the one you think it should have. (One of U. S. industry's biggest barriers to success abroad is the failure to do adequate foreign market research and make its products conform to the findings.)
6. Place service and maintenance ahead of sales.
7. Keep in touch, first hand, with foreign markets. Send top people abroad.
8. Take extreme care to respect the customs, traditions, religious beliefs, and sensitivities of foreign peoples.

Productivity Needed

If the U. S. is to boost its exports and successfully compete against imports, we must accelerate our rate of productivity improvement. Beyond that, we must take care to distribute the benefits of higher productivity in proper proportion among employees, investors, and customers. As a spokesman for Ford Motor Co. puts it: "The excessive bargaining power of unions has brought about benefits to labor from productivity at the expense of the remainder of the economy."

The first job is to hike productivity. That "requires further accelerated basic and applied research . . . essential to growth . . . and absolutely necessary to compete in world markets," John W. Craig, vice president, Westinghouse Electric Corp., points out.

● **Investment Crisis**—Perhaps the most outstanding way to achieve greater productivity is through investment in efficient new facilities. Here the U. S. lags its competitors abroad. We invest a smaller percentage of GNP in new machinery and equipment than any of the 12 nations that are our principal competitors. While we're investing little more than 5 per cent of GNP in new equipment, West Germany, Italy, Japan, Austria, Luxembourg, and the Netherlands are investing 8 to 10 per cent. Even Ecuador, hardly an industrial power, invests a larger proportion of GNP in machinery and equipment than does the U. S.

Such high levels of investment by foreign firms, coupled with their low wage rates and their rapidly improving technological capabilities, show why our production leadership is shrinking. Prof. James R. Bright of Harvard Business School points out, for example, that the most advanced transportation container system in the world is Swedish, the fastest bottling line is British, and the most highly mechanized machine tool plant is Russian. He adds that the world's most highly mechanized mail order operation is in Nuremberg, not Chicago.

Metalworking must adopt more of the mechanization advances that improve productivity. Examples: 1. Automatic work feeding. 2. Mechanized movement of materials between stations, or departments, or even buildings. 3. Feedback control mechanisms. 4. Process control computers. 5. Numerically controlled machine tools. 6. Automated assembly devices. 7. Modern communications techniques, such as closed circuit TV, two-way radio, and teletypewriters. 8. Automatic testing and inspection devices.

● **Design Needs**—No kit to fight

"U. S. Has Unlimited Potential"

—Luther Hodges, U. S. Secretary of Commerce

U. S. exports can be boosted to a $25 billion annual level within five years, Commerce Secretary Luther Hodges tells STEEL. He says the main thing to do now is get "some pep and imagination" into our foreign trade outlook—and offers several suggestions on how to do it:

● **UNDERDEVELOPED AREAS**—"The U. S. has an absolutely unlimited field for overseas investment and exports—the underdeveloped nations," asserts Mr. Hodges. He admits they have a scarcity of dollars now but confidently predicts that the dollars will come. The problem, he says, is to stir up more interest in exports among U. S. firms. "Only 5 to 8 per cent of all U. S. companies" are now in the export business, he reports. "The average small or medium size firm doesn't think about exporting until its domestic business falls off. But there are enough case histories to show that if a company exports 15 per cent of its product, the profit is always in the plus column."

● **PERSONAL TOUCH**—He believes that his effort to build North Carolina's foreign trade while he was the governor "is an illustration of what can be done on a national scale." He met 1600 foreign industrialists on a West European tour in 1959 and found most of them "receptive." He encouraged a major European pumpmaker to build a factory in his state. He helped to straighten out such situations as the shipment of German products to a New York warehouse before being forwarded to North Carolina. The items are now shipped into North Carolina ports.

He warns not to expect quick action from Europeans in investing here but believes that "any number" of foreign firms can be persuaded to come here eventually—which would help to ease the balance of payments problem. He thinks licensing will be one of the quickest ways to bring foreign funds into the U. S.

● **MOTHER HENS**—One of Mr. Hodges' favorite approaches to boosting exports is what he calls the "mother hen." It works like this: An enterprising advertising or sales promotion man teams up with an engineer. They take under their wings 10 or 15 companies making products which should be directed to a single market abroad and sell them as a package. He hopes to find ways to encourage more "mother hens."

● **DEPRECIATION REFORM**—Mr. Hodges calls unions "shortsighted" for suspecting the Kennedy administration's desire to encourage investment via tax incentives. He says "the U. S. has proved that when we modernize we continue to add to our total employment." Mr. Hodges says that companies considering expansion might look to areas in the U. S. where they have not operated before and be encouraged to spend more on research and modern machinery.

● **BUY AMERICAN**—Mr. Hodges says it is "neither reasonable nor normal" to adopt a Buy American attitude (with the possible exception of some "ruinous areas"). He also says there is no trade adjustment program in the administration now. He doesn't believe that U. S. industry wants a handout.

● **SOVIET TRADE**—Observers in Washington look for Mr. Hodges to seek a gradual lessening of restrictions on trade with Russia. The secretary's decision to allow U. S. grinding machines to be shipped behind the Iron Curtain (after an Eisenhower administrator had held up the decision) is pointed to as evidence that the Commerce Department might use this rule: If the product can be readily purchased outside the U. S., U. S. firms should have the opportunity to sell it.

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foreign competition is complete without ingenuity—the quality that has built our industrial empire. It's the guiding force in companies that have become outstanding world enterprises. Zenith Radio, for example, has unveiled a transistor radio that can be converted from a cabinet set to a shirtpocket size receiver. It plugs into the auxiliary cabinet for full room use. It's powered by two penlight batteries.

● **Adjust Your Sights**—To be successful in world markets, managers must recognize the rapid pace of change in the world today and adjust themselves to it. Only then, says Robert E. Lewis, president, Sylvania Electric Products Inc., will we begin to reap the benefits of our tremendous inventory of unrealized human potential. To demonstrate this rapid change, Mr. Lewis suggests taking a look at what has happened during the life of one man, Winston Churchill. As a young man, he fought on horseback with a saber. Today, he is worried that the H-bomb, capable of destroying civilization, is not the ultimate weapon.

PLAN FOR PROFIT GROWTH

Pressure of Employment Costs

On Mar. 27, STEEL will suggest how you can improve your profits despite the continuing pressure for higher wages, salaries, and fringes. For a free copy of any or all articles in this series (appearing biweekly since Jan. 16), write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

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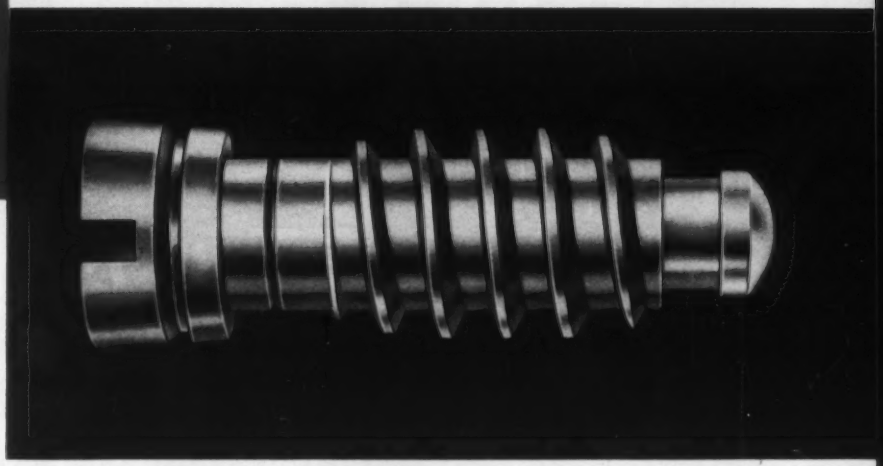
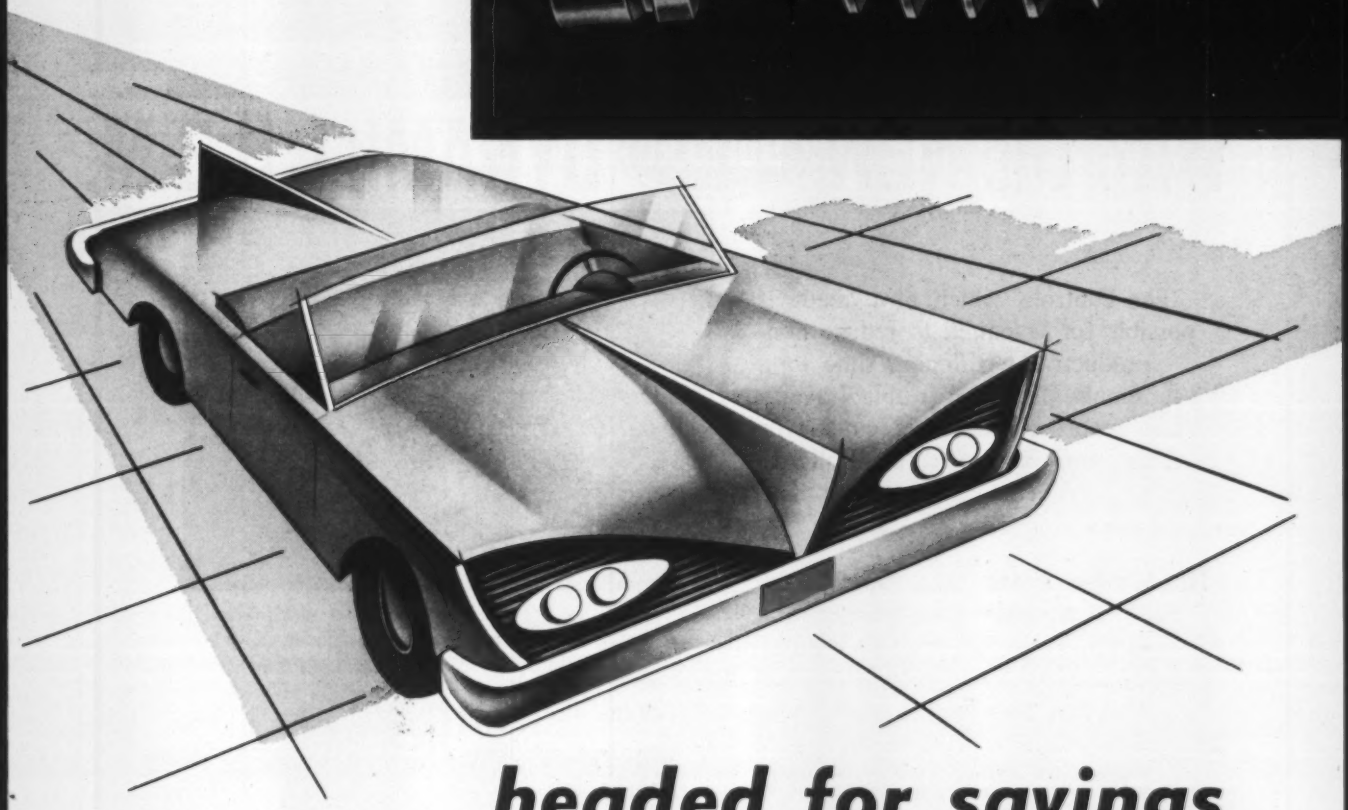
INDUSTRY





headed for savings

Like many industries, the automobile industry is seeking ways to combat foreign competition. With the cost of raw material and labor firmly fixed, automotive design engineers are seeking ways to increase fabrication speed and thereby reduce cost. They, like many others, are finding the answer to fastener design problems in cold headed parts. Cold heading provides the speed in manufacture essential to low production cost combined with flow strength which can only be maintained when all of the material is cold formed rather than partially cut away. If you are seeking ways to produce quality fasteners at less cost and eliminate the material waste and slow production time found in screw machine parts, why not call the man from GLS? Let him show you how we can cold head quality into precision fasteners for you at less cost. *We're headed for savings.*

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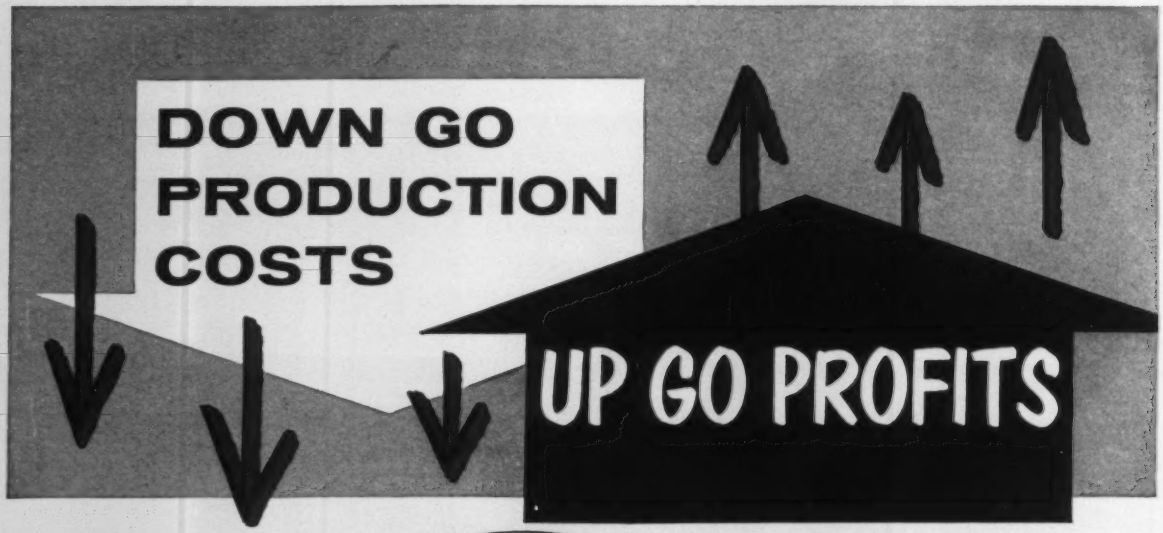
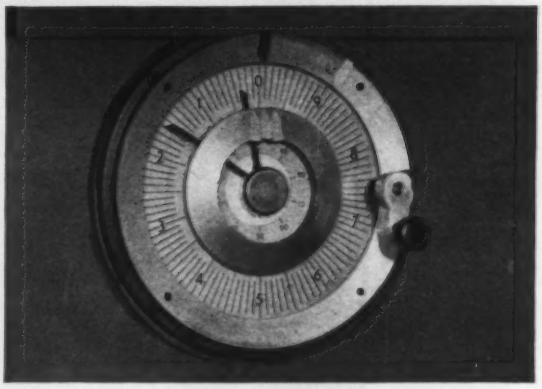
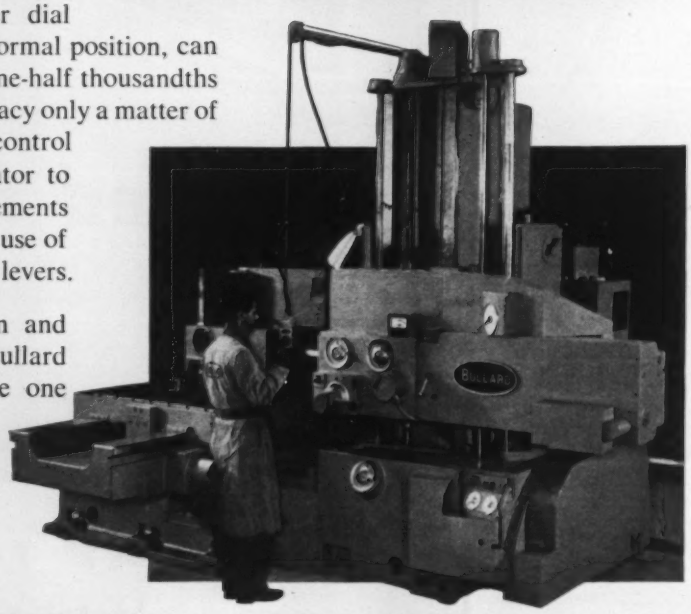


With the NEW BULLARD DYNAMILL H.B.M.



The controls, which have made it possible for Dynamill to reduce non-productive positioning time to a minimum, feature variable traverse rates recorded on large, clock-type dials, and controlled by Bullard's remote control pendant.

Head, table, saddle, and spindle each have a separate three-pointer dial which the operator, from his normal position, can easily read to an accuracy of one-half thousandths of an inch with further accuracy only a matter of simple interpolation. The remote control pendant allows the operator to traverse and position all elements under power without the use of handwheels, cranks or levers.



These and many other design and construction features of the Bullard Dynamill H.B.M. make it the one machine you

must investigate before buying any horizontal boring machine.

THE BULLARD COMPANY BRIDGEPORT 9, CONN.

Here's How Turbines Stack Up

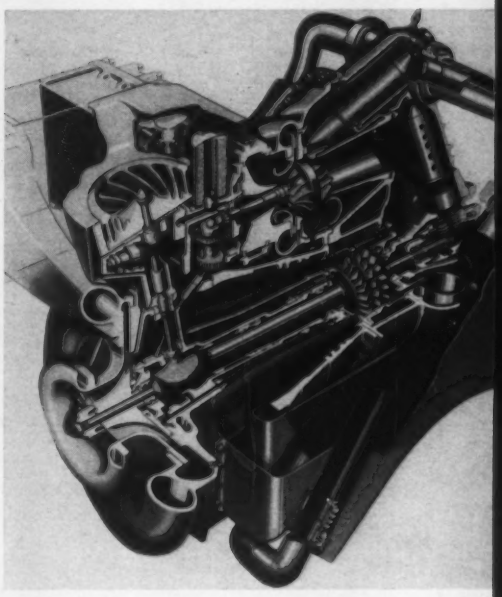
GM 305—Low pressure, simple cycle drum regenerator

Ford 704—High pressure, turbocharged stationary regenerator

Chrysler—Low pressure, variable nozzle, disc regenerator

PRIMARY USE	GM Heavy Duty Vehicles	FORD Heavy Highway Tractor	CHRYSLER Passenger Car
WEIGHT	650 lb	650 lb	450 lb
DIMENSIONS (inches)	31 x 26 x 36	38 x 29 x 31	27 x 27 x 25
SHAFT HORSEPOWER	225/3600 rpm	300/4600 rpm	140/4570 rpm
EXHAUST TEMPERATURE	520°F	740°F	400°F
PRESSURE RATIO	3.5:1	16:1	4:1
ENGINE AIR FLOW (Pounds per second)	4.25	2.7	2.2

Ford tests corrected to 100° F ambient temperature, Chrysler at 85° F, General Motors at 60° F. Ambient air pressure is 29.92 in. in all tests.



Major Problems Hurdled in Turbine Race

ONLY FIVE YEARS ago, one enthusiastic reporter predicted that by 1960 between 60,000 and 300,000 turbine powered cars and trucks would be on U. S. highways. Less than 1000 gas turbine engines are operating today in ground vehicles.

Unamortized tooling and further improvements in gasoline and diesel piston engine efficiency have delayed the need for the lighter powerplants. Even the staunchest supporters are reluctant to forecast when volume production will begin, but most of them feel that at least one type of heavy duty vehicle will have a turbine engine as standard equipment by 1970—or sooner.

Major Problems Licked

This time schedule isn't too bad considering that the first serious automotive gas turbine projects didn't start until the early 1950s. In a decade, automakers and their suppliers have solved their three biggest problems:

1. They have translated theoretical layouts into workable engines.

2. They've come up with readily available, temperature resistant alloys for turbine blades, rotors, and other critical parts.

3. They have developed precision casting techniques and other fabricating methods that permit low cost, volume production.

Asserts Ivan M. Swatman, supervisor of Ford's Turbomachines Dept., "What we need now is enough actual road operating experience to make final refinements in fuel economy and power output."

Where They'll be Used

As automakers enter what may well be the final preproduction lap, it's evident that each member of the Big Three has distinctly different ideas as to where turbines can be used most profitably. Chrysler Corp. says it is aiming primarily for the passenger car market even though it must compete with efficient, low cost gasoline engines.

General Motors Corp. and Ford Motor Co. are most interested in the heavy duty markets where their turbines would offer a sizable weight advantage over diesel powerplants. A turbine weighs a little over 2 lb per horsepower compared with 8 to 10 lb for diesel engines and 4 lb for gasoline engines. Ford would like to develop an engine for the 100,000 ton highway trailer trains that are being talked about for cross-continental hauling. GM is eying highway tractors too, but it has also shown much interest in off-the-road construction and agricultural equipment. Both Chrysler and GM will sell prototype engines for experimental and research purposes. Ford is considering a slightly different approach to getting field test experience.

How Turbines Work

The companies have different design philosophies too. To understand those differences, it's important to know how a gas turbine works. Picture a pair of water wheels, each on its own shaft. One is designed to work a pump (compressor). The other is connected

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TURBOFLITE, Chrysler Corp.'s latest experimental car, features a regenerative turbine engine which incorporates rapid acceleration and engine braking characteristics. The rear struts support an air flap that pivots upward into the air stream when hydraulic brakes are applied, creating an air drag. The car is being displayed at the Turbine Power Conference of the American Society of Mechanical Engineers in Washington

to a powershaft. When falling water strikes the first wheel, it's pumped up and forced through a narrow pipe so it strikes the second wheel with greater velocity, increasing its speed.

A turbine is laid out in somewhat the same way. A compressor sucks in air and compresses it through a duct into a combustion chamber where a constant spray of burning fuel releases gases which heat the air to about 1700° F. The stream of hot gases expands through the first turbine wheel which keeps the compressor turning. It continues through the power wheel, spinning it up to 45,000 rpm. If the engine is the regenerative type (and each of the Big Three jobs is), some type of heat exchanger recovers part of the heat from the exhaust gases so it can be re-used. That saves fuel and lowers exhaust temperatures.

How Designs Differ

Chrysler and GM have what are called simple cycle turbines. Ford has a more complex design with an additional supercharging cycle that further compresses the heated gas up to 220 psi compared with about 60 psi in the other two engines. Peak gas regeneration speed for Ford's 704 engine is 91,500 rpm compared with 33,000 rpm for GM's 305 powerplant and 44,600 rpm for Chrysler's Turboflite. Ford's power turbine wheel spins at a top speed of 36,000 rpm. The GM unit hits 24,000 rpm, and the Chrysler unit 45,700 rpm.

Heat recovery techniques also differ. Ford uses a 2 ft long stationary recuperator to return exhaust heat into the cycle. It's made from a deck of thin corrugated plates each about 3 in. square. They're formed from Type 316 stainless and brazed together. GM has a pair of rotating drums. Chrysler uses a rotating disc regenerator.

Part load fuel economy seems to be the performance area that needs most improvement. Unlike a piston engine, a turbine achieves its greatest fuel economy near full power. But few vehicles operate at full power for any length of time. To improve part load economy, Ford has located its power turbine wheel between the high and low pressure compressor wheels instead of behind them. Chrysler has adopted a variable nozzle of configuration in which hot gases pass through a circle of 23 movable vanes just ahead of the power turbine wheel. The vanes pivot up to 100 degrees so the direction and rate of gas flow over the turbine wheel can be controlled. GM apparently is relying on operating temperatures to adjust its economy curve.

Measured in terms of specific fuel consumption (SFC), Ford shows 0.48 lb per horsepower per hour at 50 per cent of load and 0.56 lb at full load. GM's full load rating reads 0.55 lb, and Chrysler peaks at 0.51 lb. Those figures are somewhat misleading, because each is adjusted to a different ambient temperature. When they're all corrected to 100° F, Ford's turbine shows definite gains in part load economy.

Turbines' Weight Advantage

The biggest advantages of any turbine are lighter weight, ability to burn almost any kind of fuel, and relative simplicity (one fifth as many parts as a reciprocating engine). High torque builds up gradually and peaks in midrange speeds.

Noise and engine braking once were considered problems. But neither seems serious now. Ford and GM engineers agree with George J. Huebner Jr., Chrysler's executive research engineer, who says, "The noise is different, that's all. It's more of a whoosh, but the actual decibel level is lower than that of a piston engine." He adds that Chrysler's variable vanes can be turned enough to almost reverse the thrust against the power wheel, acting as a retarder. Other builders apparently will depend on mechanical transmission retarders to help with engine braking.

U. S. Auto Output

Passenger Only

	1961	1960
January	414,498	688,731
February	364,397	659,323
March		654,242
April		582,909
May		611,226
June		613,147
July		434,377
August		305,527
September		407,685
October		617,816
November		597,132
December		522,239
Total		6,694,354

Week Ended	1961	1960
Feb. 4	100,589	164,027
Feb. 11	88,006	153,186
Feb. 18	76,523	158,898
Feb. 25	100,331	153,501
Mar. 4	91,655†	138,513
Mar. 11	98,000*	145,967

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

VAUGHN HAYES, Manager of Production Engineering, says:

"This Wean Slitting Line gives Chrysler Corporation's Twinsburg plant increased flexibility in production planning

by allowing us to purchase standard size mill coils. We slit these coils to meet specific production requirements, eliminating special-width coil purchases. The line's 2,000 ton-per-month output helps us eliminate production delays and coil supply problems." Mr. Hayes' comments are typical of reasons why companies are using the *coil processing concept* to lower material costs, reduce inventory requirements and decrease scrap loss. If you process 500 tons or more per month of flat rolled metals, write for our new brochure entitled, "Coil Processing."

This brochure explains the concept and economics involved in *coil processing*. It also illustrates the types of Wean equipment that can help you cut inventory, production, and material costs when you process standard *mill* coils instead of sheets.

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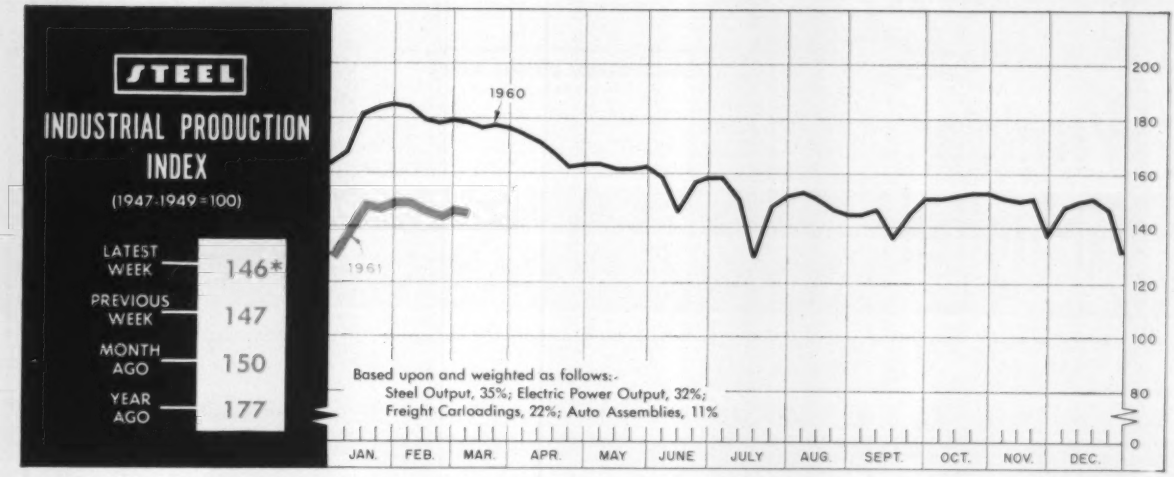

*Week ended Mar. 4.

Economy May Be in Long U-Turn

"OUTLOOK FOR 1961: Cautious optimism." That phrase is being used so often it's getting monotonous. But the conclusion is well founded.

Although we're in a recession, it's the mildest (except for steel, autos, and home goods) of the postwar setbacks. Although some indicators are discouraging, some are equally encouraging.

• **We're in the Trough**—The February survey by the National Association of Purchasing Agents is another case for "cautious optimism." The report says: "Few see any real changes before late spring. However, the bottoming out process noted in last month's report continues, indicating we may be in a broad U-turn to the better."

New orders and production figures are the brightest spots in the February NAPA report: 25 per cent of the respondents showed an increase in new orders, up from 17 per cent in December and 24 per cent in January. A decline in new orders was reported by 34 per cent in December and January; the figure was down to 29 per cent last month.

In production, 24 per cent had improvements, up from 20 per cent in January and only 15 per cent in December. The number saying their production declined fell from 33 per cent to 29 per cent.

• **Playing It Close** — Purchasing agents continue to be cautious in their buying policies, says NAPA, with only a few willing to lengthen forward commitments.

And there's no doubt that "thin" inventory levels will be with us for some time. The NAPA report shows 48 per cent of the respondents will maintain the same inventory levels in 1961 as they did in 1960; 47 per cent said they'll carry less. Tighter controls through electronic data processing and increasing awareness of the cost of possession were given as reasons.

The fact that 88 per cent of the

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)	1,580[1]	1,580	2,654
Electric Power Distributed (million kw-hr)	14,300[1]	14,239	14,262
Bituminous Coal Output (1000 tons)	6,580[1]	7,120	8,496
Crude Oil Production (daily avg—1000 bbl)	7,050[1]	7,207	7,153
Construction Volume (*ENR*—millions)	$405.6	$397.2	$505.6
Auto, Truck Output—U. S., Canada (*Ward's*)	139,178[1]	128,570	175,149
TRADE			
Freight Carloadings (1000 cars)	480[1]	468	558
Intercity Truck Tonnage (changes from year ago)	−5.5%	−6.3%	−1.6%
Business Failures (Dun & Bradstreet)	348	374	277
Currency in Circulation (millions)[2]	$31,766	$31,857	$31,516
Dept. Store Sales (changes from year ago)[2]	+11%	+7%	−7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$30,349	$25,931	$27,478
Federal Gross Debt (billions)	$291.0	$290.7	$290.6
Bond Volume, NYSE (millions)	$43.4	$29.0	$32.5
Stocks Sales, NYSE (thousands of shares)	27,103	20,697	16,240
Loans & Investments (billions, adjusted)[3]	$109.2	$109.8	$101.4
U. S. Govt. Obligations Held (billions)[3]	$30.3	$30.7	$25.5
PRICES			
STEEL's Finished Steel Price Index[4]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[5]	212.2	212.5	234.4
All Commodities[6]	119.8	119.8	119.4
Commodities Other than Farm & Foods[6]	128.2	128.1	128.5

*Dates on request. [1]Preliminary. [2]Federal Reserve Board. [3]Member Banks, Federal Reserve System. [4]1935-39=100. [5]1936-39=100. [6]Bureau of Labor Statistics Index, 1947-49=100.

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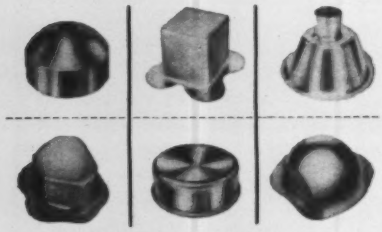

Closest tolerances adhered to in all metals, including MU METAL, BRASS, INCONEL, ALUMINUM, COPPER, CARBON STEEL, STAINLESS STEEL, NICKEL, MAGNESIUM, TITANIUM, SILVER, SPECIAL ALLOYS, HAYNES STELLITE.

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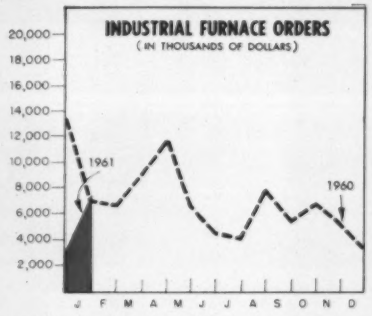
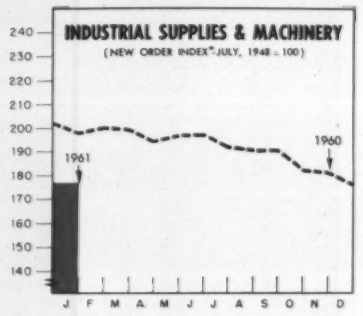
THE BUSINESS TREND



	1961	1960	1959
Jan.	7,291	6,827	4,545
Feb.	....	6,499	3,596
Mar.	....	9,033	7,842
Apr.	....	11,687	14,517
May	....	6,352	5,315
June	....	4,245	8,230
July	....	3,966	13,141
Aug.	....	7,840	9,738
Sept.	....	5,253	5,560
Oct.	....	6,634	12,867
Nov.	....	5,084	8,442
Dec.	....	3,248	13,437

Industrial Heating Equipment Assn. Inc.
Charts copyright, 1961, STEEL.



	1961	1960	1959	1958
Jan.	176	198	186	163
Feb.	...	200	202	157
Mar.	...	199	221	149
Apr.	...	194	218	148
May	...	196	218	152
June	...	197	212	164
July	...	191	216	170
Aug.	...	190	212	172
Sept.	...	190	207	178
Oct.	...	182	204	187
Nov.	...	181	202	189
Dec.	...	176	202	190

*Seasonally adjusted.
Amer. Supply & Machinery Mfrs.' Assn.

respondents said they are committing their production materials on a 60-day-or-less basis is evidence of the short term buying policy that prevails. However, forward buying is being extended beyond 60 days on capital items; 36 per cent are in six-month-or-over category. And a slight lengthening is hinted.

• **Cheering Signs**—The stock market is strong; defense orders are increasing; and nonresidential construction is rising. Dun & Bradstreet reports retail trade continues to gain over comparable periods in 1960.

New orders for industrial heating equipment in January (see chart above) jumped 110 per cent over the December level and 7 per cent above those of January, 1960. Shipments of fabricated structural steel in the first month of the year totaled 231,530 tons, 22 per cent higher than the previous month and 50,000 tons more than in January of last year. Although structural steel for buildings and bridges decreased from December, shipments were 11 per cent over the same month a year ago.

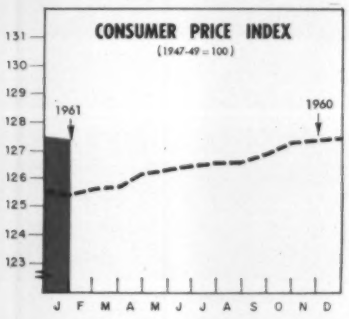
The Securities & Exchange Commission reports anticipated expenditures for plant and equipment in 1961 will be only 3 per cent below actual 1960 outlays, certainly a sign that business won't be poor this year. (See story, Page 79.)

• **Steel Turns Corner** — Weekly steel output has remained above the 1.5 million ton mark for five weeks now, well above the November-December, 1960, and January pace. Logan T. Johnston, president, Armco Steel Corp., Middletown, Ohio, says: "Very encouraging signs of improvement are the definitely increasing number of inquiries and orders in recent weeks."

Mr. Johnston explains: "Total tonnage has not shown the same increase because orders are smaller. But there are more of them. This is an indication that the small buyer is back in the market and is often seeking quick delivery."

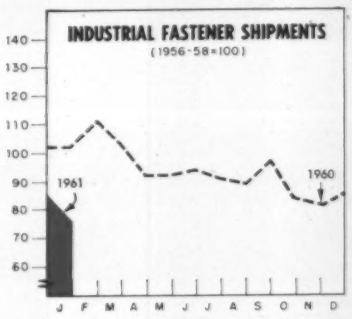
Continued gains in order entry are convincing other steelmakers that they've passed the low point in the recession which started last May.

Steel service center shipments are rising too. The Steel Service Center Institute, Cleveland, states: "As



	1961	1960	1959
Jan.	127.4	125.4	123.8
Feb.	....	125.6	123.7
Mar.	....	125.7	123.7
Apr.	....	126.2	123.9
May	....	126.3	124.0
June	....	126.5	124.5
July	....	126.6	124.9
Aug.	....	126.6	124.8
Sept.	....	126.9	125.2
Oct.	....	127.3	125.5
Nov.	....	127.4	125.6
Dec.	....	127.5	125.5

U. S. Bureau of Labor Statistics.



(Seasonally adjusted)

	1961	1960	1959	1958*
Jan.	75	102	99	133
Feb.	...	111	105	117
Mar.	...	103	105	103
Apr.	...	92	119	102
May	...	92	119	111
June	...	94	129	120
July	...	91	112	133
Aug.	...	89	77	120
Sept.	...	97	92	141
Oct.	...	83	83	137
Nov.	...	81	80	134
Dec.	...	85	102	152
Avg	...	94	101	125

*1947-49=100.
Industrial Fasteners Institute.

a result of a nationwide survey, it was determined that service center purchases of industrial steel products will increase appreciably in the first quarter as compared with the last quarter of 1960."

• **More Optimism**—While freight carloadings have been reacting in an unusual fashion so far this year, the Chesapeake & Ohio Railway believes the bottom has been reached in railroad activity. Anticipation of seasonal upturns in the chemical and building industries and resumption of lake coal shipping have prompted the line to step up its heavy repair program for hopper cars.

The long slide in new orders for industrial machinery and supplies may be slowing too. At least it has stabilized. The index (see chart) held at 176 in January for the second straight month.

• **Some Dismay**—Several areas are still in trouble. Appliance sales are poor, and a general downturn remains apparent. Despite the blossoming of auto sales with warmer weather, inventories are bulging. Furniture makers are faring much poorer than they did last year. And the industrial fastener index (see chart above) fell to its lowest point in several years—even below 1958's recession year average.

Net new orders for cutting tools fell 19 per cent below the year ago rate in January and 16 per cent under the 1960 monthly average. But sales of used machine tools were up sharply and net new orders of metal forming tools rose 55 per cent over the same month of 1960 and 61 per cent over last year's monthly average.

• **Now What?** — Walter Heller, chairman of the President's Council of Economic Advisers asserts that "a quickening pace of recovery based on the depletion of business inventories and a resumption of higher production to replenish them does not appear likely until after midyear."

But outright gloom-and-doom talk has subsided. It's not "if" but "when" the upturn will come in '61. And the mixed trends and varying opinions indicate many aspects of the economy are strengthening. So there are grounds for optimism—and caution.

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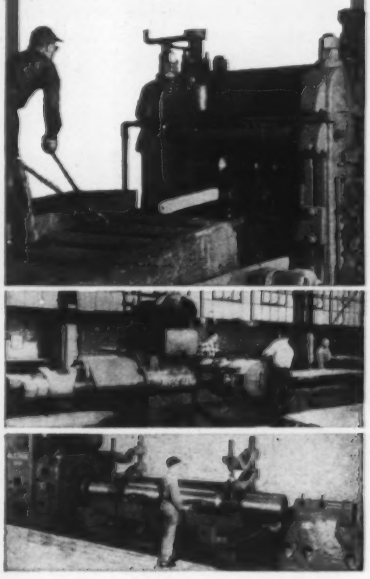
ROLLING MILL EQUIPMENT



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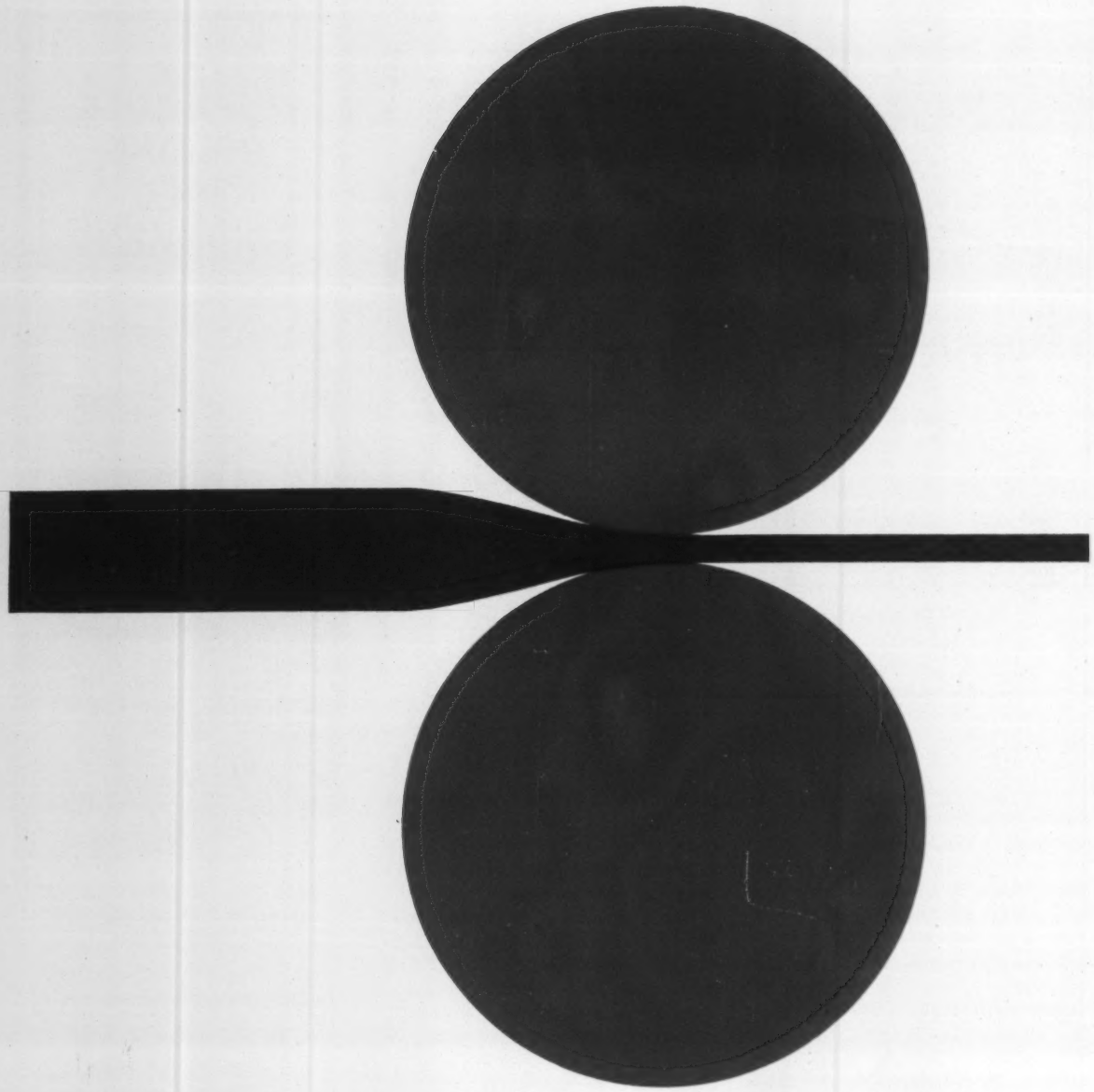
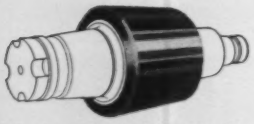


Heppenstall rolls it, cuts it, handles it



Back-up roll sleeves and rolls

Crop shear knives

Tongs—stock and custom designed

From melt shop to finished product, Heppenstall equipment plays an important part in modern steelmaking operations. Top-rate performance is provided by Heppenstall's back up roll sleeves and rolls—made from highest quality alloy steel, forged and heat treated to obtain maximum density, grain refinement and controlled hardness. Long on service is the industry-wide reputation of Heppenstall solid tool steel shear knives —for we use our own electric induction steels to assure maximum knife quality. If it has to be handled, Heppenstall tongs can help you. Regardless of shape, weight, or size, Heppenstall tongs can speed materials handling operations with greater efficiency and safety. For experienced Heppenstall service, or specific information, call our nearest Heppenstall Representative or write us direct.

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JOSEF H. BUERGER JR.
Crucible Steel sales dir.

THOMAS O. ENGLISH
heads Alcoa's purchasing

DONALD LADE
Standard Steel Wks. sales

LEONARD C. BARR
Eutectic Welding president

Josef H. Buerger Jr. was appointed director of sales, **Crucible Steel Co. of America**, Pittsburgh. He joined Crucible in October, 1960, and served as assistant to the vice president-commercial. He previously was vice president-marketing with Yuba Consolidated Industries.

Joseph C. Mogavero was appointed manager-metal production operations, Metallurgical Products Dept., Detroit, **General Electric Co.**

William R. Bidermann was appointed to the new post of chief production engineer of Telecomputing Corp.'s **Whittaker Gyro Div.**, Van Nuys, Calif.

E. M. Furness was elected vice president-operations, **Reserve Mining Co.**, Silver Bay, Minn. He was assistant executive vice president.

Mayo S. Silvey was named contact sales manager for **Pratt & Whitney Co. Inc.**, West Hartford, Conn. He was assistant to vice president-manufacturing at Alco Products Inc.

Thomas O. English, general purchasing agent, **Aluminum Co. of America**, Pittsburgh, was made head of the company's purchasing activities. He succeeds **Ralph O. Keefer**, vice president-purchasing, who has retired.

Baldwin-Lima-Hamilton Corp. appointed **Donald Lade** general sales manager of its **Standard Steel Works**, division at Burnham, Pa. He was assistant general sales manager. **Henry T. Lowell Jr.** was made general sales manager for its **Force Measurement Products Group**, Electronic & Instrumentation Div., Waltham, Mass. He was sales manager, Sperry Products Co., division of Howe Sound Co.

William S. Hammel was named sales manager, Axle Div., **Eaton Mfg. Co.**, Cleveland. He was director of European sales. **Chester D. Christie**, former sales manager of axles, was appointed assistant general manager, Axle Div., to succeed **Quentin N. Groth**, who is on special assignment in Argentina.

Leonard C. Barr was elected president of **Eutectic Welding Alloys Corp.**, Flushing, N. Y. He succeeds **Rene D. Wasserman**, now chairman. Mr. Barr was executive vice president, Gregory Industries Inc., Lorain, Ohio.

Ernest Rackel was appointed vice president-manufacturing, **Ingersoll Kalamazoo Div.**, Kalamazoo, Mich., Borg-Warner Corp. He was plant manager for K. W. Dart Truck Co., Kansas City, Mo.

William C. Adamson was made works manager of **Thor Power Tool Co.'s** main plant in Aurora, Ill. He was with Cummins Engine Co.

Louis Berkman, chairman of **Screw & Bolt Corp. of America**, Pittsburgh, has also been elected president to replace **Donn D. Greenshields**, retired.

Frank H. Mears was made general sales manager, **Pheoll Mfg. Co. Inc.**, Chicago, and **D. O. Bielen-**

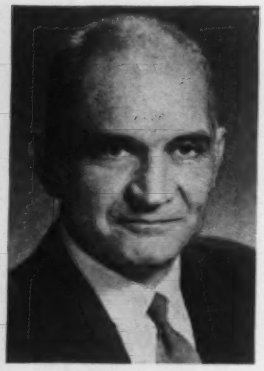
E. M. FURNESS
Reserve Mining v. p.

MAYO S. SILVEY
P&W contract sales mgr.

WILLIAM S. HAMMEL
Eaton-Axle Div. sales

FRANK H. MEARS
Pheoll Mfg. gen. sales mgr.

A. JAMES CROOKES



WARREN PARKER

James Mfg. appointments

CARTER DeLAITTRE

A. DONALD MOLL

Minneapolis Electric Steel Castings v. p.'s

berg fills the new post of director of market research.

A. James Crookes was appointed vice president-general manager, **Fort Atkinson Mfg. Div.**, and **Warren Parker** manager of purchasing for **James Mfg. Co.**, Fort Atkinson, Wis. Mr. Parker succeeds **Forrest C. Touton**, named director of the value analysis program.

J. Stewart Cruickshank, assistant works manager, was promoted to works manager for **International Harvester Co.**, Milwaukee. He succeeds **William C. Brice**, named assistant manager of the firm's manufacturing research center in Chicago.

John W. Hayes was made sales manager, **Miller Steel & Aluminum Div.**, Robert Campbell Co. Inc., Hillside, N. J.

Edward B. Carey was appointed director of marketing, **Dresser Mfg. Div.**, Bradford, Pa., Dresser Industries Inc.

Minneapolis Electric Steel Castings Co., Minneapolis, elected **Carter DeLaittre** vice president - works manager; **A. Donald Moll** vice president-sales manager.

Lewis A. Dibble Jr., executive vice president, was elected president of **Risdon Mfg. Co.**, Naugatuck, Conn. **Lewis A. Dibble**, former president, was elected to the new post of chairman and chief executive officer.

Eugene G. Sheasby was appointed vice president, Detroit Automotive Div., **Bliss & Laughlin Inc.**, Harvey, Ill., and is also in charge of the Detroit plant. **Harry M. Clarke**, formerly head of the Detroit office, was made vice president of the Harvey Div., in charge of sales, production and administration. **John M. Richards**, vice president-operations, assumes the new post of production and equipment programing, and operations research aimed at increasing productivity. **Carl S. Hogberg**, production manager at Harvey, was made assistant vice president, Buffalo plant.

Revere Copper & Brass Inc., New York, elected as vice presidents **Fritz C. Hyde**, assistant general sales manager; and **Harold C. Wilson**, sales manager-aluminum products. **John C. Emison Jr.** succeeds the late **James S. Fidler** as treasurer. **Walter R. Brent** was named assistant treasurer, and also manager of Revere's foreign operations.

John J. Bohmrich was named to head **Electric Autolite Co.'s** foreign activities, and **Stephen A. Keller** succeeds him as group vice president in charge of the company's electrical products divisions, Toledo, Ohio. Mr. Keller was vice president-general manager, Heiland Div., Denver, Minneapolis-Honeywell Regulator Co.

Ralph M. Keenan was made manager-shear knife sales, **Universal-Cyclops Steel Corp.**, Bridgeville, Pa.

Charles T. Fettel was made super-

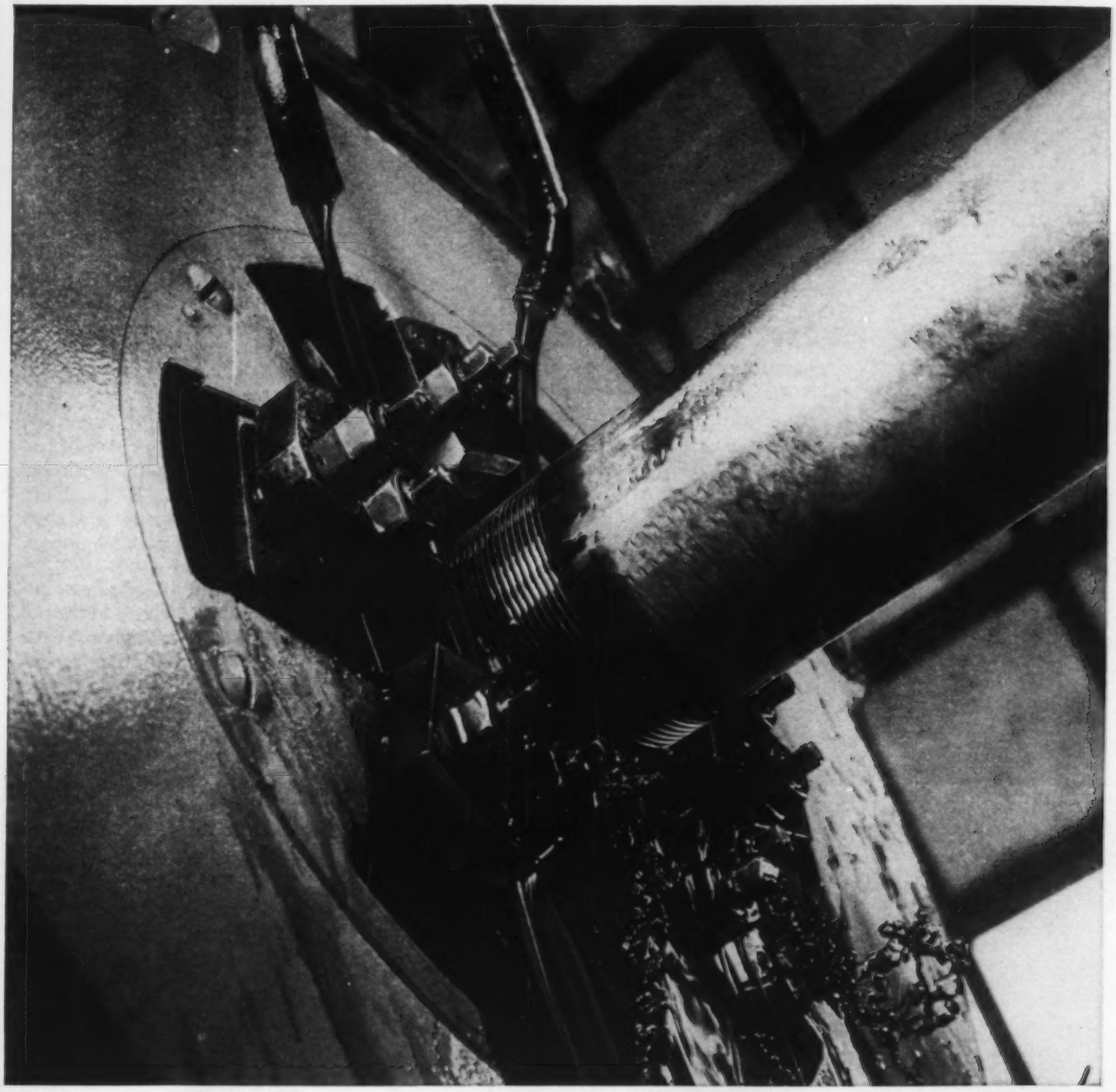
EUGENE G. SHEASBY

HARRY M. CLARKE

JOHN M. RICHARDS

CARL S. HOGBERG

Bliss & Laughlin executive positions



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GEORGE W. SMITH JR.
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new GE computer post

KIRK C. KIRKORIAN
Cincinnati Galvanizing pres.

RALPH L. SHAPCOTT
Weston Instruments post

EDWARD T. JOHNSON
Chromium Mining v. p.

W. L. VAN WINKLE
Voss Engineering div. sales

intendent of blooming, slabbing, structural mills, and soaking pits, **Kaiser Steel Corp.**, Fontana, Calif.

Ralph L. Shapcott was made director of manufacturing and assistant general manager of **Weston Instruments Div.**, Poughkeepsie, N. Y., Daystrom Inc. He was with Fischer & Porter Co. prior to joining Daystrom in 1960.

Edward T. Johnson was appointed vice president-operations for **Chromium Mining & Smelting Corp.**, Chicago, and its subsidiaries, Montana Ferroalloys Inc., and Pacific Northwest Alloys Inc.

W. L. Van Winkle was appointed sales manager, Small Diameter Rolls Mfg. Div., **Voss Engineering Co.**, Pittsburgh.

J. Algot Johnson was appointed vice president-research and engineering of **Nylok Corp.**, Paramus, N. J. He succeeds **J. E. Johnson**, now president of Aerospace Nylok Corp., a newly formed Nylok licensee. Mr. Johnson previously served as scientific director of the U. S. Army Transportation Research & Engineering Command.

J. W. Mollek Jr. was elected president of **KPT Mfg. Co.**, Roseland, N. J. He was executive vice president of Kidde Precision Tool Corp., which was recently sold and renamed KPT Mfg. Co.

C. Dana Chalfant was elected president of **Weinman Pump & Supply Co.**, Pittsburgh. **C. E. Chalfant**, who has been president and chief executive officer, is now chairman.

George W. Smith Jr. was appointed general manager, Industrial Products Div., **Westinghouse Air Brake Co.**, **Wilmerding, Pa.**, replacing **Arthur J. Bent**, reesigned.

Raymond C. Berendsen was made general manager of a new industrial process control computer section established by the Industry Control Dept. of **General Electric Co.** The new computer control activity will continue at existing facilities in Phoenix, Ariz., where Mr. Berendsen was connected with the Computer Dept.

Kirk C. Kirkorian was elected president of **Cincinnati Galvanizing Co.**, Cincinnati, newly acquired division of Bell Intercontinental Corp.

William A. Risher was named administrative assistant, a new post at **Williams & Co. Inc.**, Pittsburgh, in which he assists in handling special assignments. He is succeeded as manager, Nickel Alloys Dept., by **George Robuck.**

George R. Lippert was made manager, **George H. Lister** chief engineer of the new Communications Div. of **Victoreen Instrument Co.**, Cleveland.

Alan Wood Steel Co., Conshohocken, Pa., appointed **Grant J. Van Fossen** superintendent, **Joseph L. O'Hara** assistant superintendent of its 110 in. rolling mill and 30 in. hot strip mill.

TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls • Cinder pots • rotary tube straighteners • end-thrust bearings • heavy-duty lathes • steel and special alloy castings

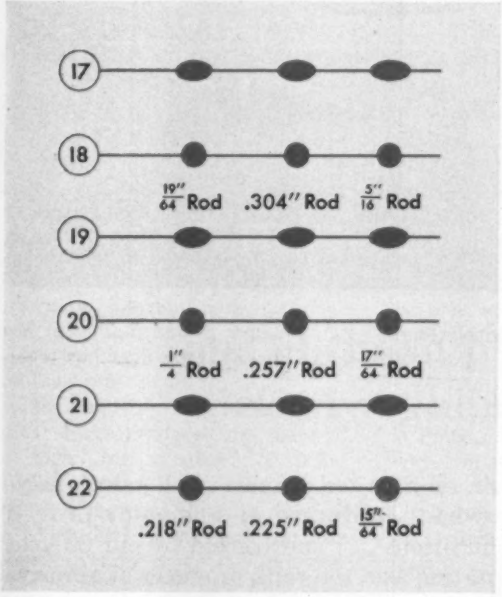
EASY WAY TO

Improve rod mill roll life...and product quality

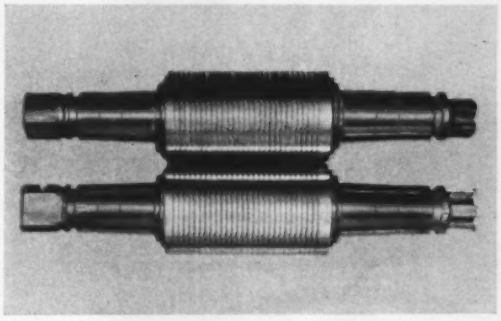
Sometimes, the tried-and-true way of doing something gets so thoroughly established that people tend to forget that there may be a better way. A good case in point is the rolls that are used in rod mill finishing stands. For various reasons, most of these mills use rolls of 70 Shore hardness or below. The passes are many and fine, and at this hardness they are relatively easy to cut.

However, several of our rod mill roll customers have been trying rolls a good 4 to 6 Shore points harder than the widely accepted top limit.

Results, in our opinion . . . and our customers'. . . have more than justified the somewhat greater degree of difficulty in turning and redressing the rolls. In fact, total turning and redressing time has been cut, since the passes wear so much more slowly. In at least one instance, the use of these harder rolls has eliminated *all* early roll changes in the finishing stands.



Flow sheet for fine rod sizes. It is the last five stands where the performance of the harder rolls makes the greater difference.



Set of #3 Nichillite rod mill finishing rolls, 74 Shore. These particular rolls have given outstanding results in the finishers at Continental Steel, Kokomo, Ind.

Stoning time cut sharply. In this particular mill, the harder rolls have cut stoning time in half. Even more important, however, is the increased yield of top-quality material. As a result, there has been a general upgrading of the product at all levels, with a consequent improvement in profits directly traceable to the harder rolls.

Two good roll analyses. If you operate a rod mill, we suggest that the next time you order rolls for the finishing stands, you specify some sets of Mack-Hemp *Nichillite* chilled nickel alloy iron rolls in the 74-to-76 Shore hardness range. These should give you performance similar to that described above, together with the best possible surface finish on the rolled rod.

Eventually you will want to raise the hardness of the intermediate stand rolls to complement the better service of the finishing stands. This will achieve a total upgrading of roll service throughout the mill and result in an even better finished product.

On the other hand, if your mill is one of the new high-speed types, we recommend our *Nironite C* nickel-chromium-iron analysis, in the same hardness range. *Nironite C* rolls provide an extra margin of strength to take the heavy torsional stresses developed by faster mills.

No matter what your problem of roll use or selection, you'll find that Mack-Hemp can give you helpful advice on the best way to solve it. Simply write or telephone us. Address Mackintosh-Hemphill Division, E. W. Bliss Company, 901 Bingham Street, Pittsburgh 3, Pa.

MACKINTOSH-HEMPHILL

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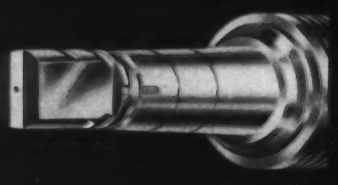
Presses, Rolling Mills, Special Machinery



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Sure, the grinding wheels you've always used may be doing the job, *BUT . . . is that job good enough* in today's cost squeeze? Let Simonds help *you* update *your* grinding practices. Complete line, available through Simonds distributors, includes wheels of all abrasives and bonds, all sizes and shapes . . . all industrially-renowned products, in efficiency-proved specifications . . . and backed by our 60 year reputation as a top-rank producer of abrasive grain and grinding wheels. Send for complete descriptive catalog.

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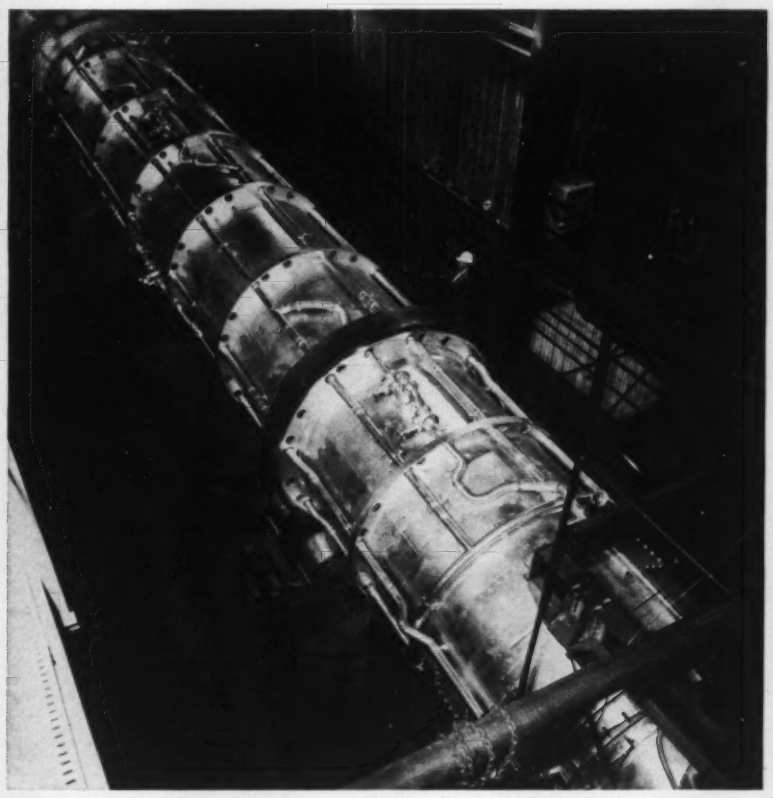


Kiln roasting is key in process in which . . .

Semi-Taconite Yields Iron

ANOTHER source of iron metallics to supplement this country's iron ore supply shows promise.

It's iron concentrate made from semi-taconite.

The economic and technical aspects of processing it into material of high iron content are being studied by M. A. Hanna Co., Cleveland. The work is being done at a $2 million pilot plant on the Mesabi iron ore range in Minnesota. The plant, which has just been started up, is at Cooley, about 15 miles southwest of Hibbing.

• **Definition** — Semi-taconite is harder than natural high grade iron ore but softer than taconite. (Taconite is an extremely hard rock containing small amounts of iron.) Semi-taconite being processed by Hanna has 25 to 38 per cent iron content. Taconite is found on the eastern end of the Mesabi range; semi-taconite is on the western end, beginning at about Keewatin, 10 miles southwest of Hibbing.

• **Processing** — The semi-taconite with which Hanna is working is nonmagnetic. The company is making it magnetic, so a magnetic process (similar to the one used on taconite) can be utilized to extract the tiny particles of iron. The process: Roasting at 1300° F. It is done in a revolving, horizontal kiln that is 80 ft long and 8 ft in diameter.

The magnetic material is then ground and run through a series of magnetic separators which pull out the liberated iron bearing particles and discard the waste rock.

The finely ground iron concentrate will be agglomerated for shipment to blast furnaces, but Hanna's work thus far has been more on extraction of iron than on agglomeration.

The end product is expected to run around 63 to 65 per cent in iron content.

• **Plenty of Material**—Vast reserves of semi-taconite lie in the western end of the Mesabi. Success at Hanna's pilot plant could lead to construction of commercial size processing plants on the iron ore range that would operate the year round. They would make markets for large amounts of machinery and equipment.

In a commercial plant, the kiln would be about 195 ft long and 12 ft in diameter.

Success with semi-taconite might also be a steppingstone to the treatment of nonmagnetic taconite.

Reynolds Buys Equipment

Reynolds Metals Co., Richmond, Va., and Colorado Fuel & Iron Corp., Denver, have reached an agreement under which Reynolds will purchase the electrical conductor manufacturing equipment of John A. Roebling's Sons Div., Colorado Fuel & Iron.

Steel Tubemaker Expands

Epps Industries Inc., Los Angeles, is installing a second electric-weld steel tube mill to double its capacity. The expansion will cost $150,000 and will be completed by the end of this month.

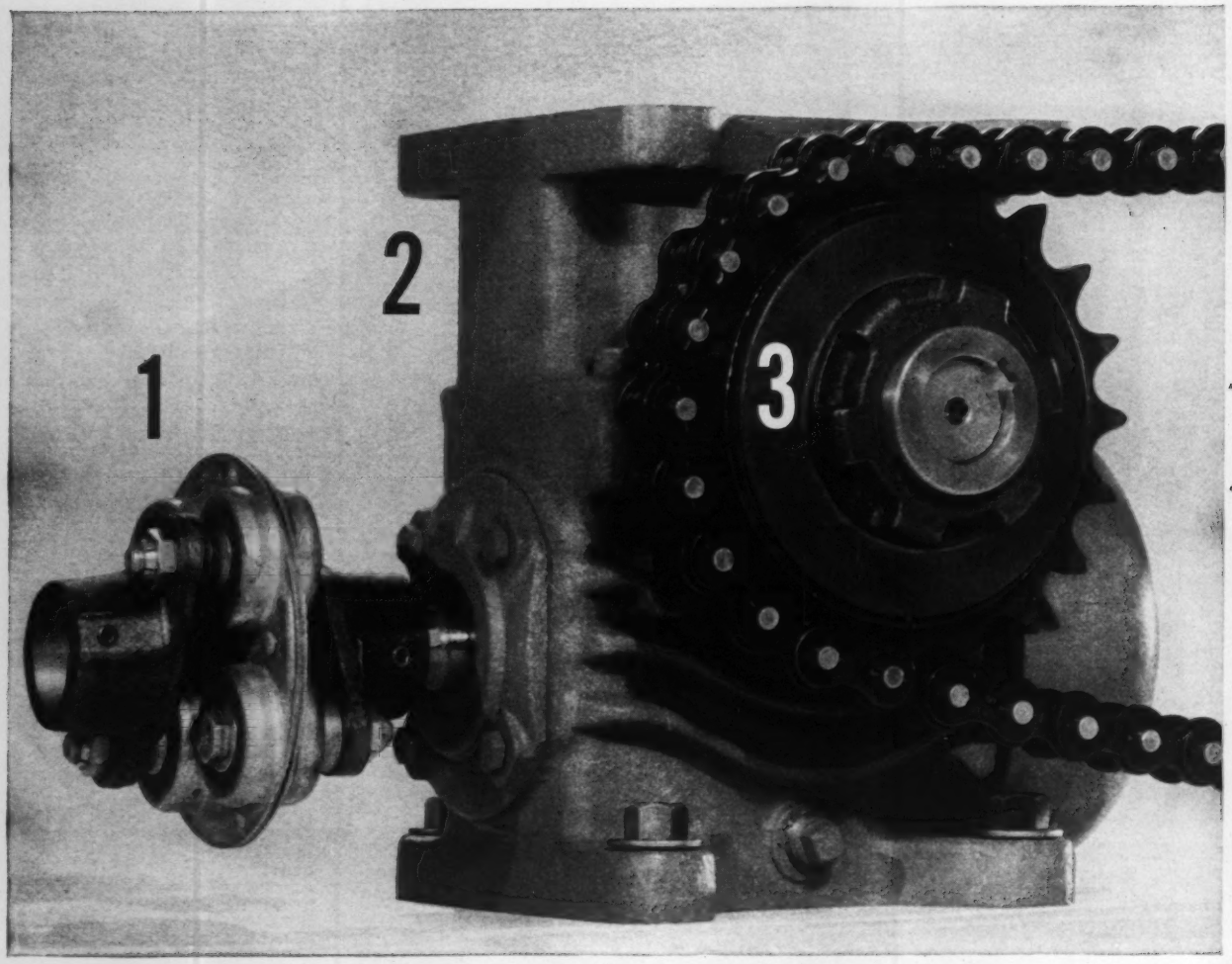
Zinc Refinery Planned

Mattagami Lake Mines Ltd. plans to build a refinery at Valleyfield, Que., to process concentrates from the new Mattagami Lake mining camp in Northwestern Quebec. The company is controlled by Canadian Exploration Ltd., Noranda Mines Ltd., and McIntyre Porcupine Mines Ltd., Toronto, Ont.

A bill authorizing construction of an $8.4 million, 60 mile, branch railway line to the Mattagami Lake area is before the Canadian Parliament. The line is to be built by the Canadian National Railways and is expected to be completed this fall.

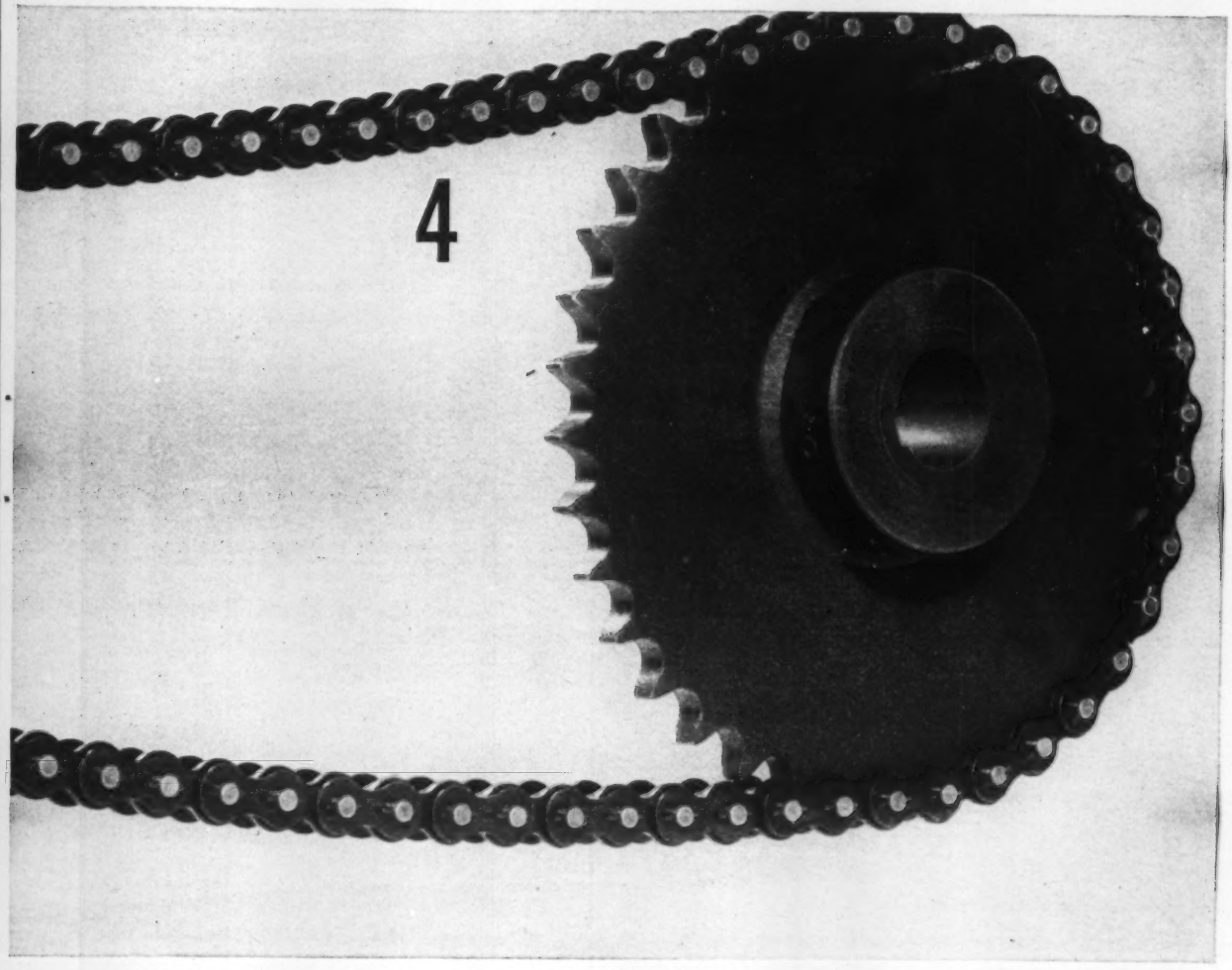
Work on the mill to produce zinc

(*Please turn to Page* 110)



Nobody can service your as completely as Morse, all four of these power

1 Couplings and Driveshafts	2 Eberhardt-Denver Speed Reducers	3 Clutches	4 Chain and "Timing" Belt Drives
Morflex	PoweRgear®	Torque Limiter	Roller Chain
Flexible Chain	Worm Gear	Cam	Silent Chain
Radial	Helical	Overcenter	Hy-Vo® Drives
Nylon	Gearmotors	Pullmore	"Timing"® Belt



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MORSE

A BORG-WARNER INDUSTRY

BW

Look for your local Morse distributor in the Yellow Pages under "Power Transmissions", or write:
MORSE CHAIN COMPANY, Dept. 2-31, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Ill. In Canada: Morse Chain of Canada, Ltd., Simcoe, Ontario

If you're looking for fasteners for that special application . . . fasteners that provide you with maximum reliability because they're precision-engineered, produced to strict tolerances and thoroughly tested . . . it will pay you to check with Chandler first! Here's why . . . Chandler has specialized for over thirty years in producing high quality special fasteners . . . as well as standard cap screws and bolts to meet rigid aircraft, military and industrial standards. Design features of these cold-headed fasteners include special heads, shanks or threads . . . drilled, rolled, ground, plated or coated . . . plus controlled atmosphere heat treating . . . to comply with your requirements.

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CP

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NAME_____TITLE_____
COMPANY_____
STREET_____
CITY_____ZONE_____STATE_____

(*Concluded from Page 107*)

and copper concentrates from ore mined by Mattagami Lake Mines is scheduled to start this spring. The refinery would turn out annually 165,000 tons of zinc.

An estimated $30 million will be invested in the mine and mill.

Plans Australian Plant

Carborundum Co., Niagara Falls, N. Y., will construct a $1 million coated abrasive manufacturing plant in Melbourne, Australia. Carborundum Australasia Pty. Ltd., a Carborundum subsidiary, operates a plant in Sydney, Australia. Its manufacturing operations will be transferred to the Melbourne plant when it is completed late this year.

Several Firms Renamed

Several firms in the metalworking industry have announced changes in corporate names. These include:

Eastern Malleable Iron Co., Naugatuck, Conn., changed its name to Eastern Co. The company makes malleable iron, stainless steel, and permanent mold aluminum castings, and a range of fabricated products.

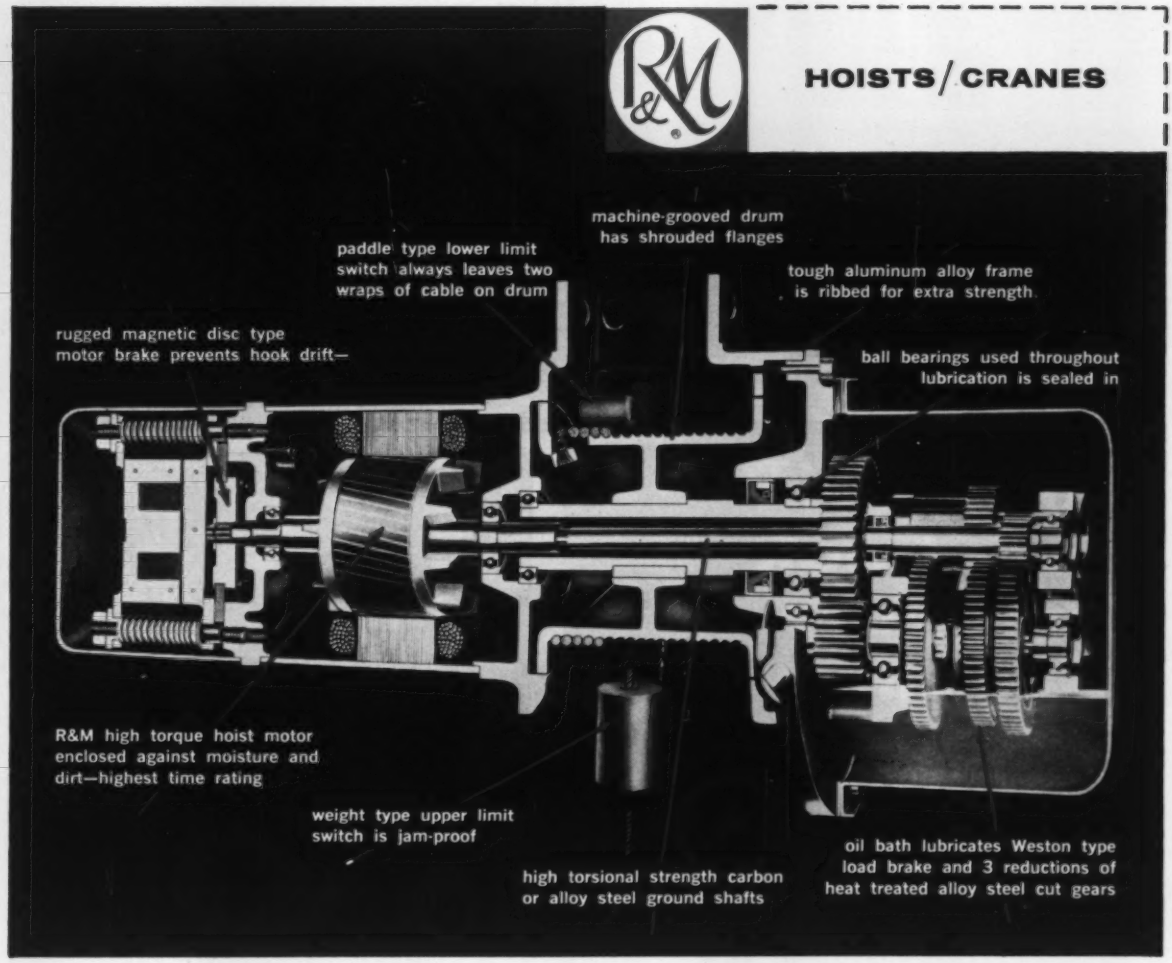
West Bend Aluminum Co., West Bend, Wis., changed its name to West Bend Co. The firm now works with steel alloys, copper, brass, and plastics as well as aluminum. The company makes housewares, appliances, outboard motors, and two cycle engines.

Stanley Works, New Britain, Conn., changed the name of its Stanley Electric Tools Div. to Stanley Power Tools Div.

Jelrus Precision Casting Co., New York, changed its name to Casting Engineers, the same name as its parent firm in Chicago. Casting Engineers makes investment castings and is a division of Consolidated Foundries & Mfg. Corp., Chicago.

Flour City Architectural Metals Div., Hupp Corp., is the new name for Flour City Ornamental Iron Co., Minneapolis. Henry J. Neils is president of the division which is one of two operating units established by Hupp Corp., Cleveland, following purchase of the Minneapolis firm at yearend.

Lord Chemical Corp., York, Pa.,


R&M
HOISTS/CRANES
machine-grooved drum
has shrouded flanges
paddle type lower limit
switch always leaves two
wraps of cable on drum
tough aluminum alloy frame
is ribbed for extra strength
rugged magnetic disc type
motor brake prevents hook drift—
ball bearings used throughout
lubrication is sealed in
R&M high torque hoist motor
enclosed against moisture and
dirt—highest time rating
weight type upper limit
switch is jam-proof
high torsional strength carbon
or alloy steel ground shafts
oil bath lubricates Weston type
load brake and 3 reductions of
heat treated alloy steel cut gears

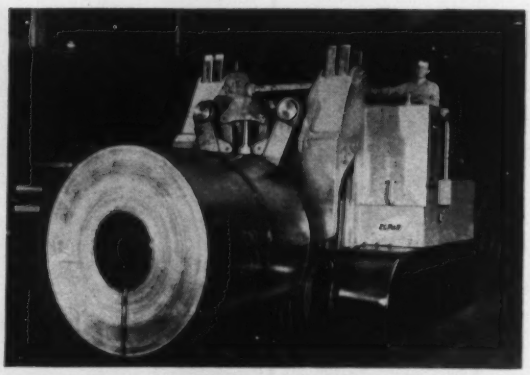
HOIST VALUE WHERE YOU NEED IT

Robbins & Myers Type J hoists can go to work for you this week. Since they are stocked near you, it's no trick at all to see—and benefit from R&M's superb design advantages. They give value beyond competitive price: *because* no other hoist has a higher rated, better protected motor (30 minute, 55° C. rise), *because* you get two brakes—a disc type motor brake and a Weston type load brake, *because* you get upper and lower non-jamming limit switches. Ball bearings are used throughout and the three reductions of heat treated alloy steel gears are lubricated in a sealed bath. Capacities—¼, ½, 1 and 2 tons; mounting—lug is standard, push, hand geared and motorized trolleys are available. Voltage is reduced at the push-buttons; control is magnetic. Request Bulletin 905 from the Hoist & Crane Division of Robbins & Myers, Inc., Springfield, Ohio or Brantford, Ontario.

ROBBINS & MYERS

hoists & cranes, Moyno® pumps, motors, Propellair® fans

This 35,000-pound giant is shown handling huge aluminum billets—four at a time.



Another heavy duty ELPAR ram truck designed for handling steel coils. Built for handling efficiency and safety.

An ELPAR fork truck for every handling job

1 to 20 tons capacity—with more than 40 standard models

Cut your truck operating costs with ELPAR fork trucks. Built to match the finest equipment in your shop, they need a minimum of maintenance and repair—even on the toughest jobs. And, they run on low-cost electric power.

There is a model for every handling task, and an experienced ELPAR representative to help you pick the best one for your plant.

WRITE FOR THIS CATALOG
Complete details on all heavy duty ELPAR fork and ram trucks.

ELPAR
ELECTRIC TRUCKS

The Elwell-Parker Electric Company
4101 St. Clair Avenue
Cleveland 3, Ohio

In Canada: International Equipment Ltd.

This ELPAR Titan is designed to load coils weighing up to 20,000 pounds in box cars.

Handling coils of steel weighing up to 20,000 pounds is a typical job for the ELPAR Titan Series.

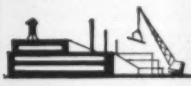
Add flexibility to your ELPAR trucks with special attachments like this clamp used to speed handling of wire fencing.

has been renamed Lord Chemical & Equipment Div., Wheelabrator Corp., Mishawaka, Ind. The division makes precision finishing equipment, media, and compounds in York and Red Lion, Pa. Paul H. Setzler is vice president and general manager of the division.

NEW OFFICES

Scientific & Process Instruments Div., Beckman Instruments Inc., Fullerton, Calif., opened a sales office at 3545 Lindell Blvd., St. Louis, Mo. E. J. Klein will be responsible for sales of scientific (laboratory) instruments; Jack Weir, process instruments.

A. O. Smith Corp., Milwaukee, opened a Welding Products Div. district sales headquarters in Newark, Calif. A. R. Schneller is regional sales manager for the division.



NEW PLANTS

Universal Bearings Inc., Bremen, Ind., moved its operations to a newly constructed plant at 1505 W. Dewey St., that city. The new facility contains 6000 sq ft of floor space. The firm makes needle rollers for the automotive industry.

Inland Steel Products Co., Milwaukee, opened a new warehousing operation at 672 Townsend St., San Francisco, Calif. The complete line of Milcor metal lath products will be stocked.

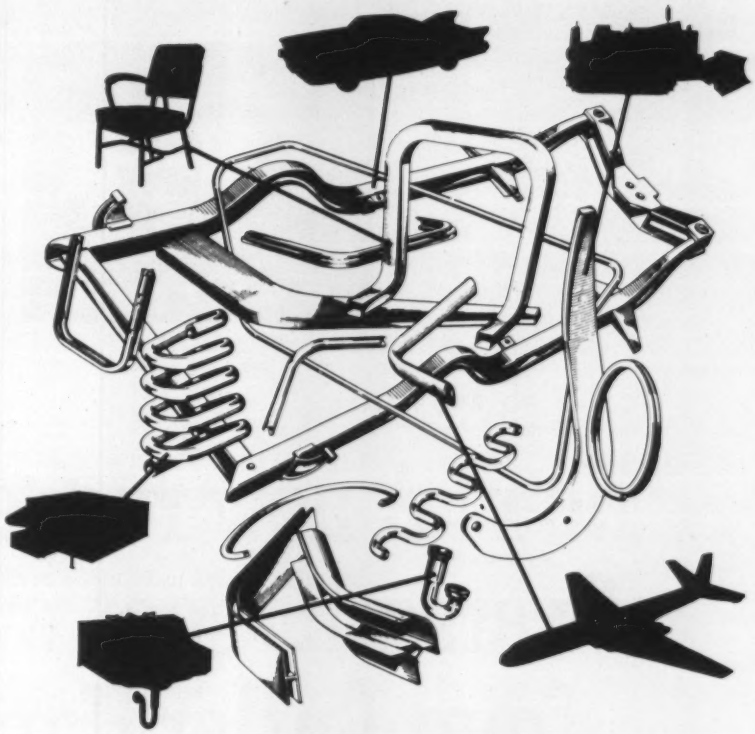
A third wire and cable plant of the **Electric Autolite Co.,** Toledo, Ohio, and its fourth West Coast facility, will be in operation Mar. 20. The 26,000 sq ft facility at El Segundo, Calif., will have a daily capacity of 500,000 ft of wire and cable.

National - Standard Co., Niles, Mich., has established a warehouse in Dallas to serve distributors of copper covered, steel wire.

American Steel Warehouse Co., Portland, Oreg., opened a steel serv-

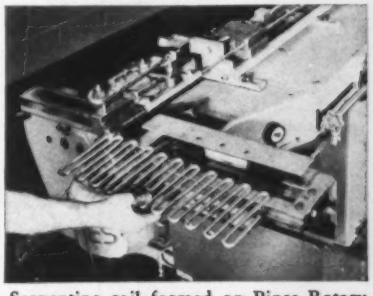
(*Please turn to Page* 116)

IF YOU MAKE PARTS LIKE THESE...

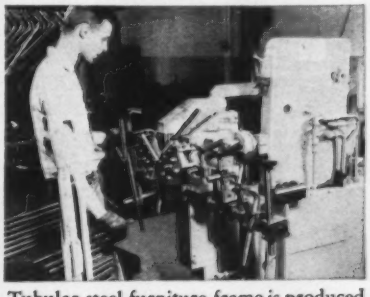


YOU CAN SAVE BY BENDING!

By production bending the "Pines-way," hundreds of metalworking plants are now benefiting from the cost-cutting advantages of cold-bending tubing, pipe, extruded or rolled shapes into parts similar to those above. Parts are produced faster, with smooth, strong bends. This means improved product quality at reduced costs.
A wide range of bending on large or small work, long- or short-run jobs, is easily accomplished by a complete line of standard Pines Bending Machines. Hydraulic power and automatic operation provide maximum accuracy, efficiency, and economy. Find out today, without obligation, how these machines can produce your parts at less cost.



Serpentine coil formed on Pines Rotary Machine at 900 bends an hour with 8% material savings, reduced assembly costs.



Tubular steel furniture frame is produced on a Pines Bending Press at the exceptional rate of over 2000 bends an hour.

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PINES ENGINEERING CO., INC.

Specialists in Tube Fabricating Machinery

662 WALNUT • AURORA, ILLINOIS

PRODUCTION BENDING • DEBURRING • CHAMFER MACHINERY

Now! A new rugged line of versatile foot switches from Cutler-Hammer

Smartly styled . . . four types . . . designed to be used many different ways

Now you can get the same high quality in foot switches you find in Cutler-Hammer motor starters.

Our new foot switches are designed to be stepped on, kneed, elbowed, palmed or whatever method you can think of to use them. Heavy gauge metal and rugged construction will keep these switches operating long after others have failed.

You get versatility, too. The heavy duty, side treadle switch has three interchangeable operating arrangements that can be made easily in the field by just changing the position of a nylon cam, and all are styled alike to give you uniformity in appearance.

Be sure to get full details from your Cutler-Hammer distributor and send for Pub. LO-91-E213.

What's new at Cutler-Hammer?
We've geared up for the great growth of technology coming in this decade . . . with new, better products like the foot switches, new engineering talent, new plant facilities. If you're planning ahead, let's get together. Maybe we could help you with your electrical control and automation plans. Get in touch with the Cutler-Hammer Sales Office nearest you.

WHAT'S NEW? ASK . . .

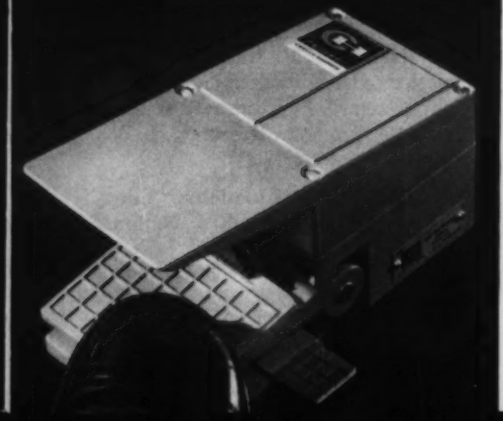
CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

HEAVY DUTY SIDE TREADLE OPERATED FOOT SWITCH

Most versatile foot switch you've ever seen. Just by changing the position of a nylon cam, you can change the operation of the switch on the job. Comes with four nameplates (Start, Stop, Forward and Reverse). Pick the two you want, toss the other two.

HEAVY DUTY TREADLE SWITCH WITH FOOT LOCK Non-slip tread helps keep operator's foot from slipping. Available with several types of guards. Locks when depressed, opens when red release is touched.



HEAVY DUTY PALM-TYPE SWITCH Big orange surface easy to see. Rated for 600 volts maximum. Neoprene gasket stays flexible, resists effects of oil.

STANDARD DUTY TREADLE-OPERATED FOOT SWITCH Use it for a knee operation. Has a rating of 600 volts maximum. Three mounting bosses permit mounting on uneven surfaces without rocking.

Your New 1961 Data on . . . Kinnear Rolling Doors

In any doorway, Kinnear provides an unbeatable combination of lower door costs, extra protection and higher efficiency. Kinnear's upward-acting curtain of interlocking slats (originated by Kinnear!) coils compactly above the opening. All space *around* doorways is fully usable at all times. The curtain opens completely out of the way, closes to give you a rugged all-metal curtain of protection against wind, weather, fire, and vandals. 50 years *and more* of continuous, daily, low-maintenance service have been recorded for many Kinnear Rolling Doors. They're also REGISTERED — all parts of every Kinnear door can always be accurately duplicated from master details kept permanently in fireproof vaults. Get all these Kinnear Rolling Door benefits and more; write for this new 1961 catalog.

and rolling grilles, counter shutters and fire doors

The KINNEAR Manufacturing Co.

FACTORIES: 1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, California
Offices and Agents in All Principal Cities

(*Concluded from Page* 113)

ice center at 2305 Radio Lane, Redding, Calif. The new facility will be operated by American Steel subsidiary, Coast Steel & Supply Co.

Bennet Industries Inc., Peotone, Ill., is constructing a plant at Alta Loma, Calif., with completion scheduled for late April or May. Products will include 3 gal. to 7 gal. pails.

ASSOCIATIONS

J. S. Smart Jr., American Smelting & Refining Co., New York, is 1961 president of the **Metallurgical Society of the American Institute of Mining, Metallurgical & Petroleum Engineers**, New York.

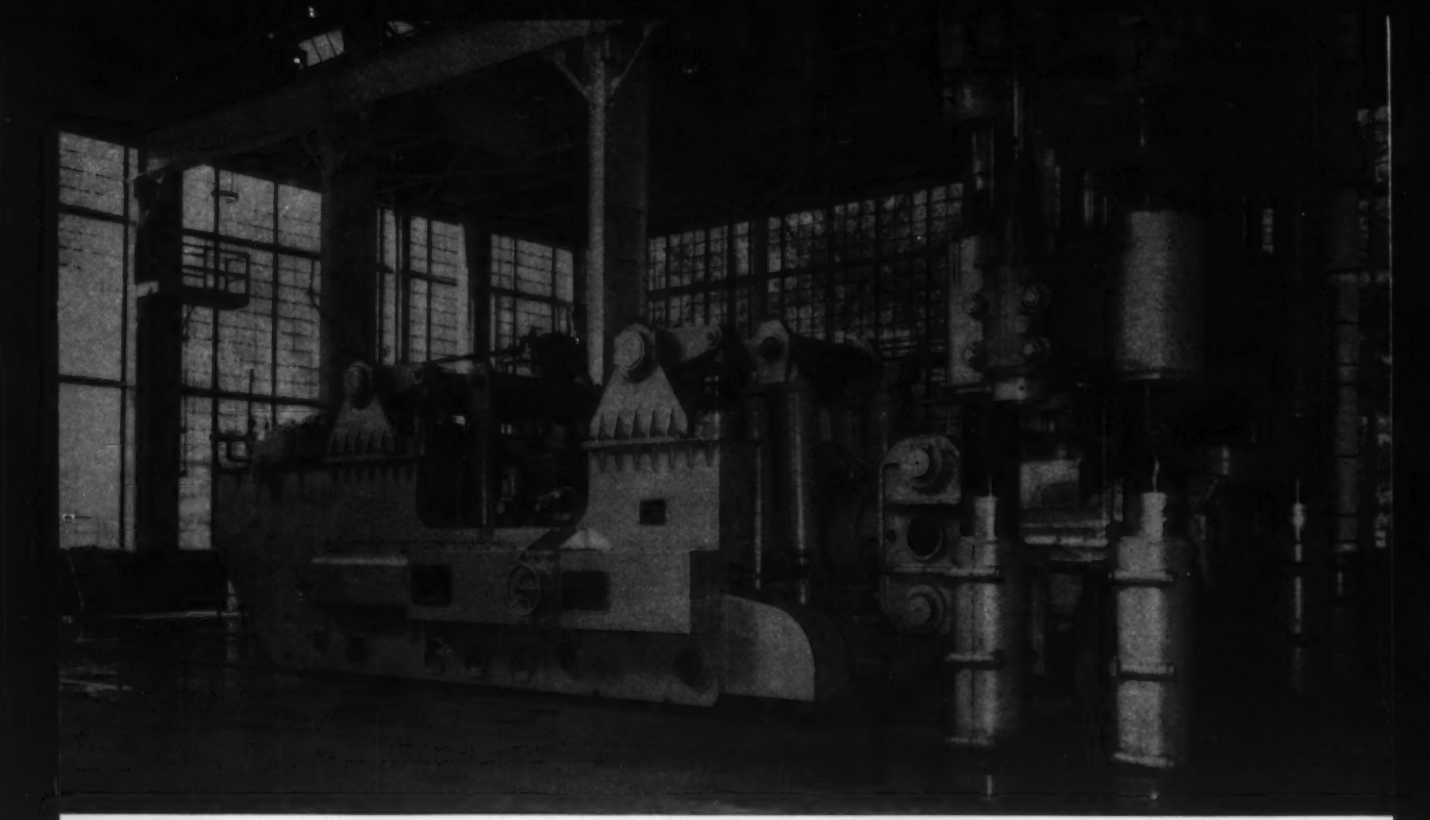
CONSOLIDATIONS

Gould-National Batteries Inc., St. Paul, purchased **Wilkening Mfg. Co.**, Philadelphia, manufacturer of piston rings. The Wilkening firm will be operated as a subsidiary under the presidency of W. E. Wilkening.

Howe Sound Co., New York, acquired **Electric Wire Co. Inc.**, Northampton, Mass., manufacturer of fine wire and specialized wire products. The new property will be operated under its present management as part of Howe Sound's Super Alloy Products Div.

H. M. Harper Co., Morton Grove, Ill., acquired **Anti-Corrosive Metal Products Co.**, Castleton-on-Hudson, N. Y. The firm specializes in the manufacture of stainless steel industrial fasteners. Earle A. Channer, vice president-sales at H. M. Harper, has been elected president of Anti-Corrosive; H. M. Harper Jr., secretary at H. M. Harper, has been elected vice president and assistant secretary. F. J. Legnard remains as vice president-treasurer; J. W. Manning, secretary.

Consolidated Aluminum Corp., Jackson, Tenn., acquired **National Foil Co. Inc.**, Elizabeth, N. J. W. A. Hunt will continue as president and R. E. Hunt as secretary-treas-

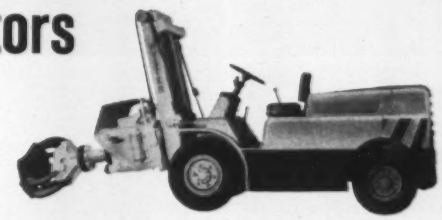


Hydraulik forging manipulator at Ohio Steel Foundry Company

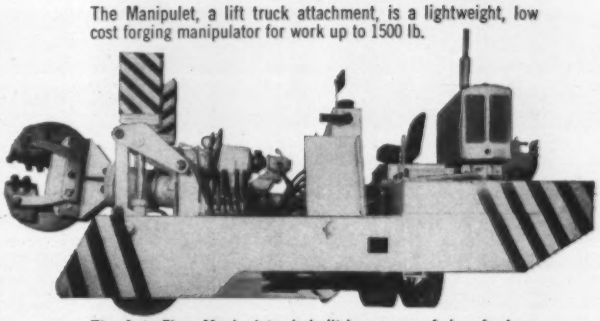
New heavy-duty addition to the Salem-Brosius Family of forging manipulators

Salem-Brosius, long well known for its Auto-Floor Forging Manipulators and manipulating attachments for fork lift trucks, now offers the forging industry the HYDRAULIK line of manipulators.

These machines feature fireproof water hydraulic systems, and are built in a range of capacities from 20,000 to 200,000 lb. Their rugged design and construction assure satisfaction under the most rigorous forging conditions. Outboard control pulpit assures that the operator has full work visibility at all times. High speed and precision of machine motions assure high production rates and work quality within the most rigid forging tolerances. Write today for further information.



The Manipulet, a lift truck attachment, is a lightweight, low cost forging manipulator for work up to 1500 lb.



The Auto-Floor Manipulator is built in a range of sizes for handling work during forging in weights from 2000 to 20,000 lb.

Salem-Brosius, Inc.

PITTSBURGH, PENNSYLVANIA

Salem-Brosius (Canada) Limited, Rexdale, Ontario • Salem-Brosius (England) Limited, London and Milford, England
Salem-Brosius (France) S.A., Paris, France • Salem-Brosius (Luxembourg) S.A. • Alloy Manufacturing Corp., Pittsburgh, Pa. • R. H. Freitag Manufacturing Div., Akron, Ohio • General Ionics Corp., Pittsburgh, Pa.

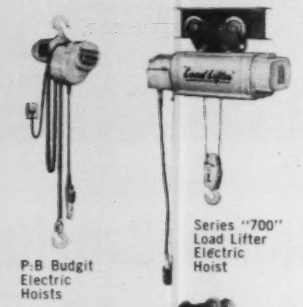
Lifting Made Easy

HOISTS AVAILABLE FOR EVERY LIFTING JOB

1✓ ELECTRIC HOISTS for frequent lifting with pace setting speed

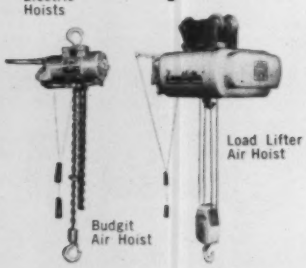
2✓ AIR HOISTS to lift fast where atmosphere conditions are hazardous, corrosive, extremely hot, dirty or wet

3✓ CHAIN BLOCKS for easy lifting where the work cycle is moderate



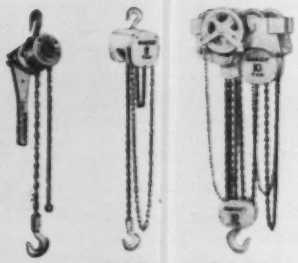
P:B Budgit Electric Hoists

Series "700" Load Lifter Electric Hoist



Budgit Air Hoist

Load Lifter Air Hoist



Tugit

Budgit Aluminum Chain Block

Budgit Army Type Chain Block

ELECTRIC HOISTS

P:B Budgit® Electric Hoists. 1/8 to 2 tons. Modern push-button hoists for regular service. Portable. Two fully enclosed automatic brakes. Spotting action is fast, accurate. 1/2-ton load can be lifted at 34 FPM. Hook suspension. Trolleys available. Standard models for intermittent service — AC, DC, and 12-volt battery types — have pull cord control.

Load Lifter® Electric Hoists. 1/2 to 15 tons. For heavy-duty and production line service. Safe 24-volts at the push button. Single and 2-speed control. A ton can be lifted at 60 FPM. Two automatic brakes. Types for lug or hook suspension; also with push, hand-geared or motor-driven trolley. Hi-hook model increases length of lift.

AIR HOISTS

Budgit® Air Hoists. 1/4, 1/2 and 1 ton. Compact, lightweight hoists for regular lifting service. Link and roller chain types. Explosion proof motor. Spark and corrosion resistant link chain models. Speeds infinitely variable to 75 FPM. Pull cord control. Safety hooks standard. Rigid mount type and push trolley available.

Load Lifter® Air Hoists. 1 to 15 tons. Wire rope type for heavy-duty service. Five cylinder motor for smooth operation at all speeds. Speed infinitely variable to 37 FPM. Pull cord control standard; throttle control available. Mechanical load brake adjusts itself. Lug, push trolley, and hand-geared trolley suspension.

CHAIN BLOCKS

Tugit® . . . the Lever-Operated Hoist. 3/4 to 3 tons. Light. Compact. Portable. Operates easily at any angle even in close quarters. Has countless uses in every industry. Spur-geared for highest efficiency. A 42-lb. pull on the handle lifts 2 tons. Spark and corrosion resistant models.

Budgit® Chain Blocks. 1/4 to 10 tons. For production or maintenance. Combine light, strong aluminum frame with spur-geared lifting and automatic load brake. 25 lb. pull on hand chain lifts 1/4 ton. Hook suspension standard. Trolleys available. Army-type Budgit has integral trolley that can be adjusted to fit several sizes of I-beams and permits high hook lift. Ask about spark and corrosion resistant models.

SOLVE YOUR LIFTING PROBLEMS. Call your nearby Shaw-Box Distributor for practical help in selecting the best type of overhead load handling equipment — hoist or crane — for each task. Or, write us for literature.

D

MAXWELL MM&M MANNING & MOORE, INC. TRADE MARK

OVERHEAD LOAD HANDLING EQUIPMENT

Products of

MANNING, MAXWELL & MOORE, INC.

Shaw-Box Crane & Hoist Division • Muskegon, Michigan

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario.

urer of Consolidated's new subsidiary.

Temperature Engineering Corp., Riverton, N. J., will purchase **Steiner-Ives Co.**, Union, N. J., subject to approval of stockholders. Temperature Engineering makes atmosphere enclosure systems; Steiner - Ives, high temperature ovens.

NEW ADDRESSES

Waterbury Farrel Foundry & Machine Co. has moved into its new, multimillion dollar plant at Cheshire, Conn. Its old plant at Waterbury, Conn., will be sold.

Western Piping & Engineering Co. Inc. moved its office and fabricating plant to 1485 Yosemite Ave., San Francisco 24, Calif.

Pennsalt Chemicals Corp., Philadelphia, transferred its Sales Technical Service groups to expanded laboratory facilities at 900 First Ave., King of Prussia, Pa. The groups were previously housed at Pennsalt's Whitemarsh Research Laboratories, Wyndmoor, Pa., and at Devon, Pa. The 31,000 sq ft customer service laboratory is the first unit to be completed in the company's planned $6 million Technical Center. Pennsalt plans to start construction of a second building in mid-1961.

Tubular Structures Corp. of America and **Tube-Strut Corp.** have moved into expanded office and production quarters at 4560 Sperry St., Los Angeles 39, Calif. An 8000 sq ft building is being constructed to increase floor space to 34,000 sq ft.

Sciaky Bros. Inc., Chicago, is transferring its Research Div. from Los Angeles to its recently enlarged plant at 4915 W. 67th St., Chicago 38, Ill.

Ultrasonic Industries Inc. moved to Engineers Hill, Plainville, N. Y. Robot Metalcraft Corp., a subsidiary specializing in precision sheet metal fabrication, is also integrated in the Engineers Hill operation. The plant contains 18,000 sq ft of floor space.

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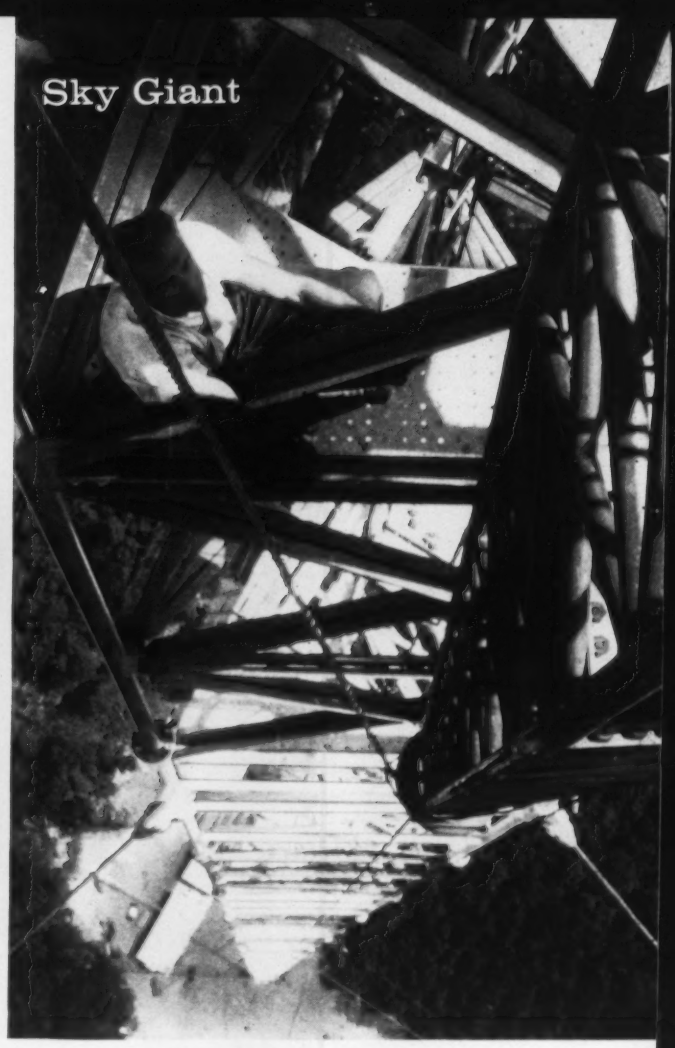
UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at Pittsburgh, Vandergrift, Youngstown, Canton, Wilmington

SUBSIDIARIES: Adamson United Company, Akron, Ohio; Stedman Foundry and Machine Co., Inc., Aurora, Indiana

Designers and Builders of Ferrous and Nonferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses and other heavy machinery. Manufacturers of Iron, Nodular Iron and Steel Castings and Weldments.



Two more extraordinary welding jobs done with M&T Murex Electrodes

THIS 6,588,000-LB. SHOVEL on the 50-yard line of a football field could dig a 65 cu. yd. dipperfull in one end zone, lift it 140 feet high, swing its 170-ft. boom and pile the 100 ton load atop a 12-story building in the opposite end zone.

THE TALLEST MAN-BUILT STRUCTURE, the new transmission tower for KFVS-TV, Cape Girardeau, Missouri has equally impressive statistics. It stretches 1676 feet skyward. Weighing 1000 tons, it has solid steel legs up to 7½" thick, can withstand over 100-mph winds.

Joint integrity is an absolute requirement for a shovel that chews up huge bites of earth...or a tower built to be buffeted by hurricane-force winds. Isn't it significant that welding on these giant jobs was done with M&T Murex electrodes? The electrode that's good enough to meet these requirements is certainly good enough for everyday jobs too.

Yet you get even more than a quality product with M&T Murex electrodes. You get reliable technical service from trained welding specialists. These men are well qualified to help you select the proper type from one of the broadest lines of electrodes—over 1000 types and sizes.

So call in the M&T man for details or recommendations. Or send for a copy of the Murex Electrode Selector.

M&T **welding products** · plating products
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METAL & THERMIT CORPORATION, General Offices: Rahway, New Jersey

Technical Outlook

ULTRASONIC DEBURRING—An exceptionally powerful ultrasonic generator is said to provide sufficient energy to remove microscopic burrs from small machine parts immersed in a deburring medium. Described by Ultrasonic Systems Inc., Los Angeles, as an important development in microdeburring, the device is expected to be helpful in deburring a wide variety of small precision parts and castings.

IMPROVED SHIELD FOR METAL— A new transparent vinyl 0.0015 in. thick is said to offer adequate protection to metal sheets against scratching and surface abrasion. It is easily removed by hand or with an air blast, claims Aluminum Co. of America, Pittsburgh.

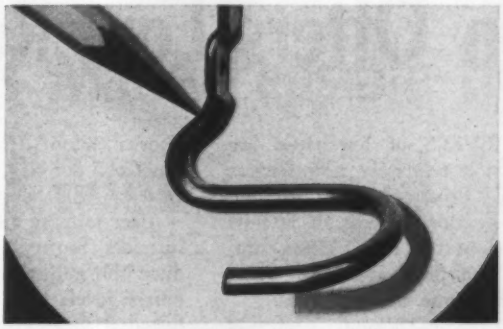
CUMULATIVE FATIGUE— Recent studies of stress effects on 7075 aluminum reveals that conventional ideas about damage should be revised. Tests show that interaction between infrequent high stresses and frequent low stresses produces a disproportionately large amount of damage during periods of low stress. You can get details by writing OTS, Department of Commerce, Washington 25, D. C., for PB 161837.

NEW HI TEMP SEALS— A composite sheet of molybdenum fibers impregnated with silver seals off pulsating gases at 5000 psi and 1200° F, says Armour Research Foundation of Illinois Institute of Technology, Chicago. It was made for the Air Force. Similar composites have been tested at Republic Aviation Corp., Farmingdale, N. Y. In one case, the seal retained hydraulic fluid for 93 hours (336,000 pressure pulses) at 1000° F.

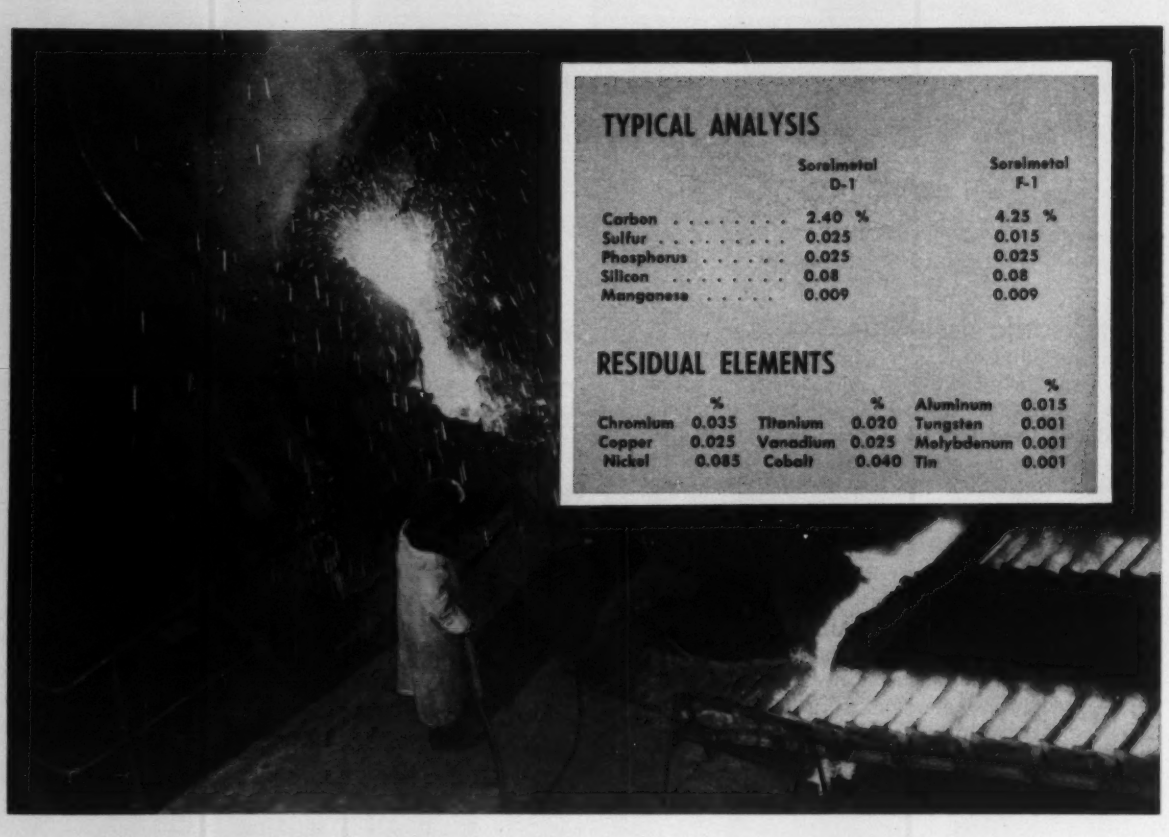
ELECTRIC AUTOS— Small electric motors in each wheel make an effective propulsion system for vehicles, believe Jack & Heintz Co., Cleveland, and Reo Div., Lansing, Mich., White Motors Co. The system being developed for Army Ordnance employs conventional powerplants and an alternator (the new fuel cells can also be adapted). Trucks so equipped have the added advantage of being excellent stationary power sources which provide direct current, 60 cycle and 400 cycle alternating current.

VIBRATION STUDY URGED— When operating speed doubles, mechanical vibration increases four times, claims E. G. Hart, president, International Research & Development Corp., Worthington, Ohio. He feels more attention needs to be paid to that subject in terms of routine preventive maintenance, especially where bearings are concerned.

THIN MEMORY PLANES— Tiny, mirrorlike wafers of a nickel-iron alloy deposited on glass substrates are making possible faster memory systems, says Ray Eppert, president, Burroughs Corp., Detroit. The first type stores 20 words of 8 bits or 160 bits. Response of each bit takes place in billionths of a second (called nanoseconds).



WASHER HINGE FAILURES FALL both in forming and in service with a switch to stainless steel wire for the hooklike part pictured. Reason: Consistent tensile strength of the stainless, says Carpenter Steel Co., Reading, Pa., which is furnishing the wire. It says Dudek & Bock Spring Mfg. Co., Chicago, has turned out over a million pieces with no rejects. The hooklike hinges are installed in top lids of Whirlpool washers.



The pig casting process is conventional; the iron is not. So this . . .

Iron Offers Low Residuals

LOW LEVELS of impurities are offered in a relatively new ferrous material. Product of a Canadian direct reduction process, it is now stockpiled in ten U. S. cities, supplied to foundries and steelmakers under the name of Sorelmetal.

The unconventional refining method accounts for the low levels of elements other than iron in the product. It is made by Quebec Iron & Titanium Corp., Sorel, Que., and offered in this country by Miller & Co., Chicago.

• The metal is supplied in two grades, differing in their carbon levels, and in the form of pig or shot.

The D-1 grade contains 2.25 per cent carbon; the F-1 grade has 4.25 per cent. Both grades contain sulfur (about 0.02 per cent) phosphorus (about 0.025 per cent) silicon (0.05 per cent), and manganese (about 0.009 per cent).

After tapping from the reduction furnaces, the metal is treated to reduce the sulfur content to the required levels, and the carbon is adjusted if necessary. It is then cast as pigs or converted into shot form by water granulation (particle size of the product can be controlled).

The low levels of elements other than iron and carbon are unusual in melting stock. They can be helpful by permitting the dilution of objectionable impurities in scrap. "Even where the high purity of Sorelmetal is not needed for reducing impurity levels," says W. L. Walsh, president of Quebec Iron & Titanium Corp., "melters have used it because of its uniform composition."

• One use is in the manufacture of ductile or nodular cast iron.

The low silicon content of Sorelmetal permits the producer to charge generated scrap without silicon buildup. And ferrosilicon magnesium alloy can be used as the source of the magnesium for causing nodulization, offering a cost saving. The low manganese content of Sorelmetal aids too in producing fully ferritic, ductile iron.

Close control of analysis is essential in the production of nodular iron. Mr. Walsh points out that one way to hold down the levels of objectionable — or "subversive" — elements that may tend to accumulate because of scrap or recycle material is to dilute them; Sorelmetal, he notes, appears to be about the only commercially available raw material that will effectively dilute

all of the elements considered subversive.

• The metal may be matched to other foundry applications.

Many special cast irons can be produced more easily from a charge with low residuals. Examples are Ni-Hard and Ni-Resist, trade names of high nickel alloys which withstand specialized conditions. Ni-Hard requires low silicon to promote its wear resistant properties. Corrosion resistant Ni-Resist has a higher silicon level, but can be affected by trace impurities.

In casting malleable iron, the low content of the carbide stabilizing elements chromium and manganese aids in the malleablizing process. Since silicon must be limited in malleable iron, the foundryman using Sorelmetal can charge return scrap without running into problems of excessive silicon.

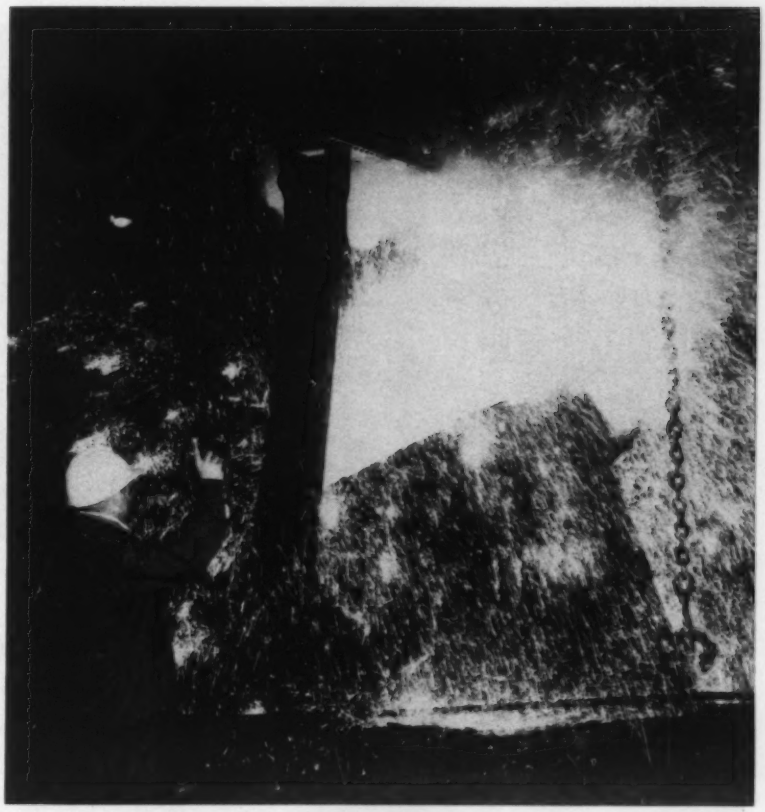
• Steelmakers find the metal helpful.

Because of the low alloy content of Sorelmetal, most of the carbon is combined. That lowers the melting point, making additions to a steel bath easier, says Mr. Walsh. So it has been used for the recarburizing step in the production of high carbon steels in electric and open hearth furnaces. The combination of high carbon with low sulfur and phosphorus is helpful in electric and open hearth practice.

Low residual alloy content is important in the manufacture of various alloy steels and tool steels. Many tramp metals found in scrap are not removed in normal refining; dilution is a means of keeping them below troublesome levels.

• The refining process accounts for low alloy content, determines carbon range.

The direct reduction process used by Quebec Iron & Titanium Corp. does not take all of the iron from the charge. A portion of it is left in the slag; that lowers the melting point of the slag, making it easier to handle. The limited reduction also accounts for the low titanium content in the iron, the lower carbon than is usual in blast furnace reduction, and the low limits of other metals, which are not reduced and therefore stay with the slag.



Ladle desulfurization precedes casting, but . . .

Process Made Feasible by Sale of Both Iron and Slag

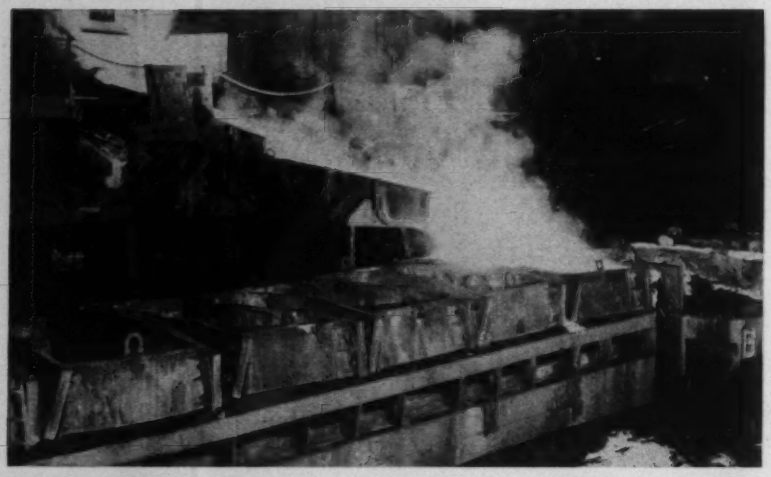
AN UNUSUAL reduction process is turning out iron from an ore which would otherwise be useless —and the slag is worth about as much as the metal.

Starting with a mixed hematite and ilmenite ore (an iron-titanium mineral), most of the iron is recovered as the metal. The slag contains some of the iron and all the titanium; it is sold to producers of titanium pigments and titanium metal. The company, Quebec Iron & Titanium Corp., Sorel, Que., Canada, is jointly owned by Kennecott Copper Corp. and New Jersey Co.

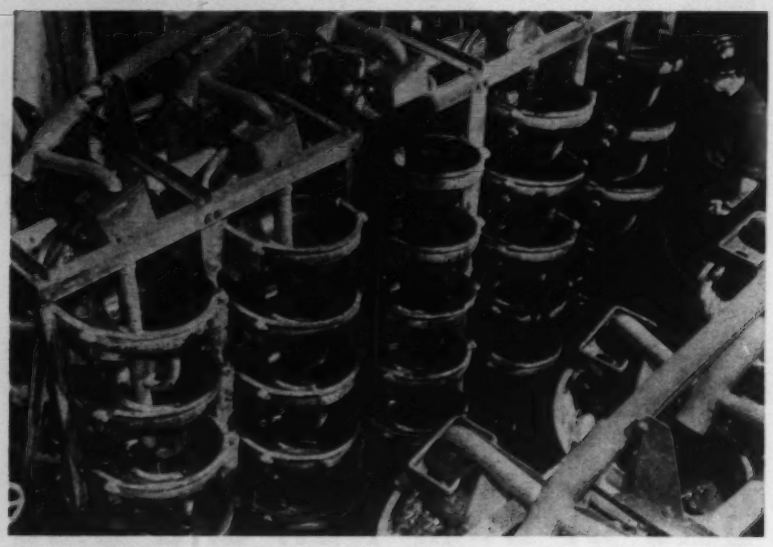
• Use of standard treatment methods was not practical for the ore.

The hematite could be used in blast furnace practice, but the titanium in the ilmenite would be recovered in the product. Ilmenite is used in the manufacture of titanium oxide and titanium metal, but the process converts the iron to iron sulfate (which is nearly valueless). The hematite would increase the consumption of acid, and

Furnace slag is tapped into molds



SLAG IS VALUABLE because of its high titanium content. It's sold for making pigments or metal



HUMPHREY SPIRALS use water to upgrade ore fines before they are charged to the reducing furnace

the amount of iron sulfate byproduct would be excessive.

Sulfur content of the ore was another consideration.

• Key to successful recovery was separation of the iron as metal.

At the mine, the ore is crushed to under 2 in. The Sorel plant reduces it to less than ⅜ in., separates the fines, and processes both to remove gangue. Heavy media methods are used for the coarser fraction. Humphrey spirals are used for the fines. The combined concentrates are roasted in kilns fired by gases recovered from the smelters.

After cooling, the concentrates are blended with kiln dried anthracite which serves as the reducing agent, and the mixture is charged to the smelters—six-electrode, electric arc furnaces lined with basic brick. They are operated as open bath, open arc units, and the mixed ore and anthracite is charged around the periphery of the bath to reduce the attack of the slag on the furnace refractory.

At the bath temperature, around 3000° F, the anthracite reacts to reduce the iron. Since iron oxide is present in excess, the reduction is not complete. A portion of the iron oxide remains in the slag, reducing its melting point, so that it presents less of a handling problem while tapping. Halting the reaction at this point also holds the titanium in the slag, keeping it out of the metal.

• Metal and slag are tapped separately.

The furnace is tapped every 3 to 4 hours. Four to six times per day, the slag is tapped into mold cars. It is water sprayed for cooling, then crushed for shipment. Titanium content of the slag, calculated as TiO_2, is 70 to 72 per cent for the pigment grade, 74 to 75 per cent for the metal grade.

The iron is tapped two or three times a day. The sulfur as tapped runs about 0.11 per cent, so ladle desulfurization with calcium carbide is standard practice. The treatment drops the sulfur content to about 0.02 per cent. Ladle additions may be used for changes in composition to meet special requirements before the product is cast into pigs on conventional, double strand casting machines.

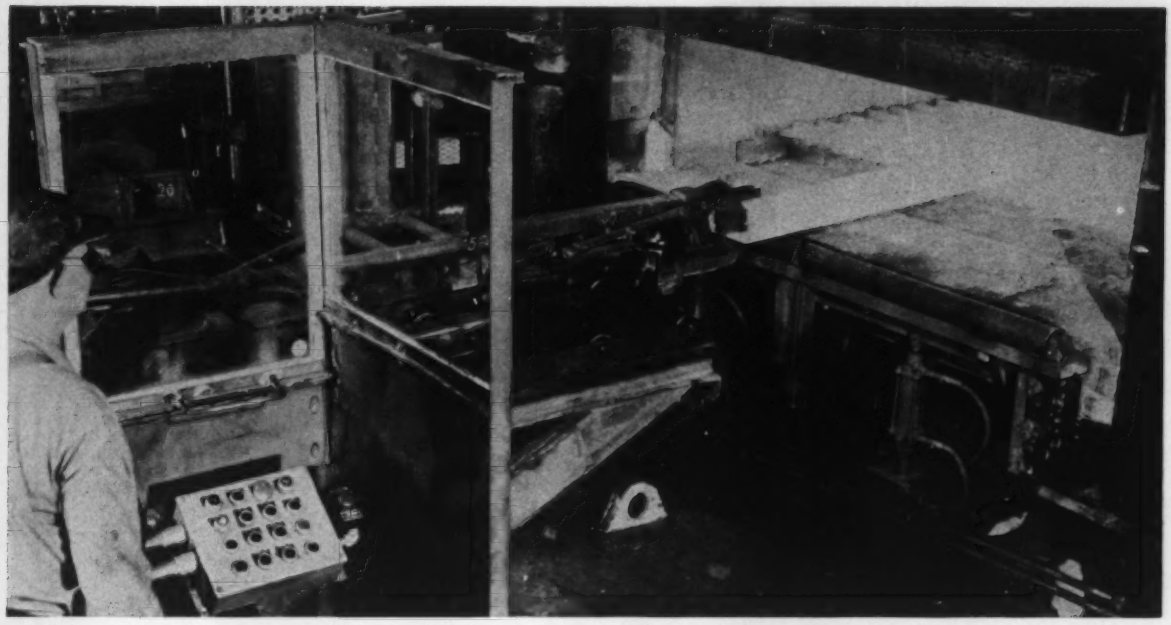
• Some of the iron is granulated.

Both the low carbon and the recarburized high carbon grades of iron produced at the Quebec Iron & Titanium plant have been made as granulated products by water granulation from the molten metal. The high carbon grade, in particular, is easily ground and decarburized for making smaller particle sizes.

• Even the material not charged to the furnaces has potential value.

The product separated from the ore in the beneficiation step has a high content of calcium and aluminum oxide. It is marketed as Sorelflux, a substitute for fluorspar on a total or partial basis, in basic steelmaking practice.

Some of the ore itself is sold as a heavy aggregate for concrete where increased density is needed. For example, it increases the weight of gas transmission lines so that they do not tend to float in marshy areas. Density of the ore is in the range of 4.3 to 4.6 times as much as water.



By improving a steel and building die quench press . . .

A. O. Smith Develops Lighter Truck Frame

AN UNUSUAL die quenching press and a modified SAE 1027 steel have been combined to benefit weight sensitive owners of heavy trucks.

A. O. Smith Corp., Milwaukee, says its technique makes trucks lighter without sacrificing strength. Production costs have also been reduced.

Principal features of the improvement include:

- A basically martensitic steel, heat treated and tempered, which enables the firm to achieve yield strengths of about 117,000 psi and a fatigue strength comparable to that of SAE 8620—an alloy that costs nearly 40 per cent more.
- A die quenching press which eliminates distortion of long truck side rails.

The weight reduction can be significant. (On one model, it amounts to 27 per cent, claim A. O. Smith officials.) Truck owners will pay a premium of about $1 for each pound of tare weight eliminated.

• Production people selected furnace heating and water quenching as the most economical way to handle side members up to 40 ft long.

Side rails of alloy steel used to be heated to 1650° F, quenched in circulating oil, and tempered at 900° F. A good deal of distortion—bending, bowing, twisting—was introduced and required hand straightening. Much of the production cost was attributed to hand labor. Besides, the method couldn't be adapted to mass production, and full hardness could not be obtained.

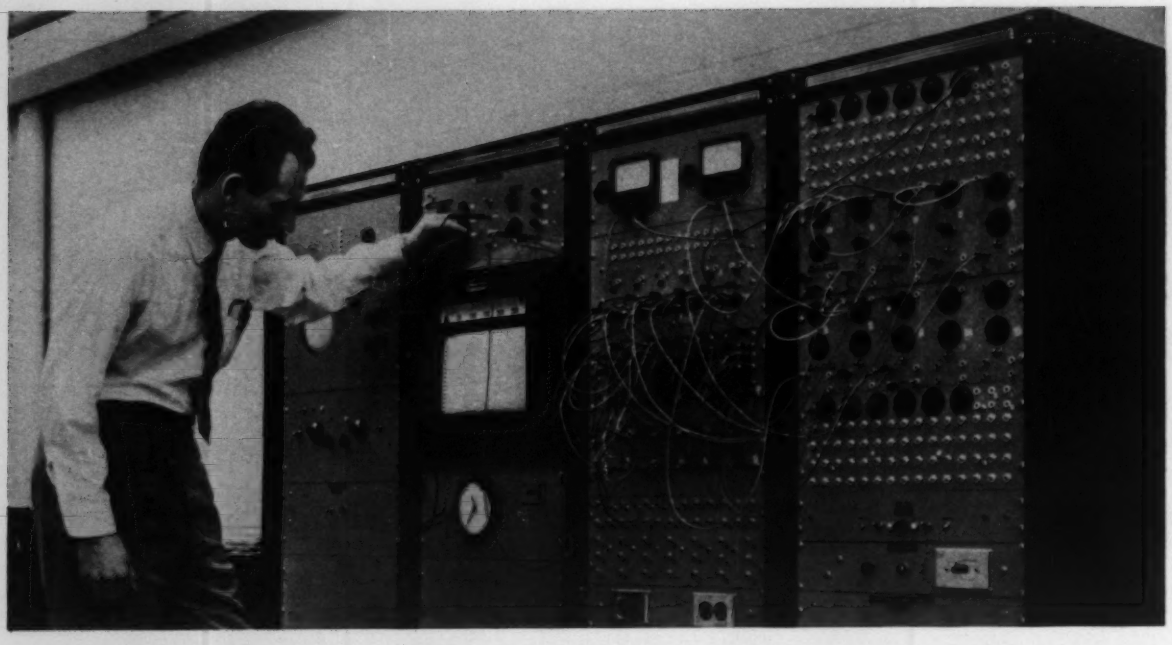
With the new method, side rails are taken from the furnace by a handling device which quickly transfers them to the quenching machine. Once the rails are spotted, a punch drops into the channel of the rail, expands to fit the flanges and press them against the outer walls of the die. Pressure applied during quenching keeps the rail straight.

All faces of the die in contact with the hot rail are water cooled. A waffling of the die surfaces permits additional water to flow over and around the rail to insure complete, quick coverage.

• During development, A. O. Smith metallurgists worked out the new formula for modifying SAE 1027.

The type now specified contains 0.22 to 0.30 per cent carbon and 1.00 to 1.35 per cent manganese. That formula, metallurgists declare, has the right potential to match the more enriched steels if a powerful quench is employed. (The hardenability effects of nickel and chromium acting on 0.25 per cent carbon can be equaled by a percentage of manganese acting on the same amount of carbon if a heavy quench is used.)

A. O. Smith's tests have showed that ultimate tensile, yield, elongation values for the modified composition and SAE 8620 are about equal. Charpy impact transition curves indicate that the material is tough at subnormal temperatures.



Analog device duplicates thermal responses, using basic values . . .

Simulator Solves Problems in

PURCHASERS of equipment and services are basing more decisions on information obtained from electronic devices—simulators, computers, and data processing systems.

Examples: Customer problems in heat application are being duplicated and solved with analog circuitry at Selas Corp. of America, Dresher, Pa. The simulator (called Thermolog) was designed and built by the company's research division personnel.

• The simulator saves time and manpower in solving a particular type of differential equation for any one of its boundary conditions.

Information is obtained through simulation of temperature and other thermal entities that are analogous to electrical parameters. Many of the problems that are simulated cannot be carried out on the job or in the laboratory because of environment at the job site or physical limitations of research equipment.

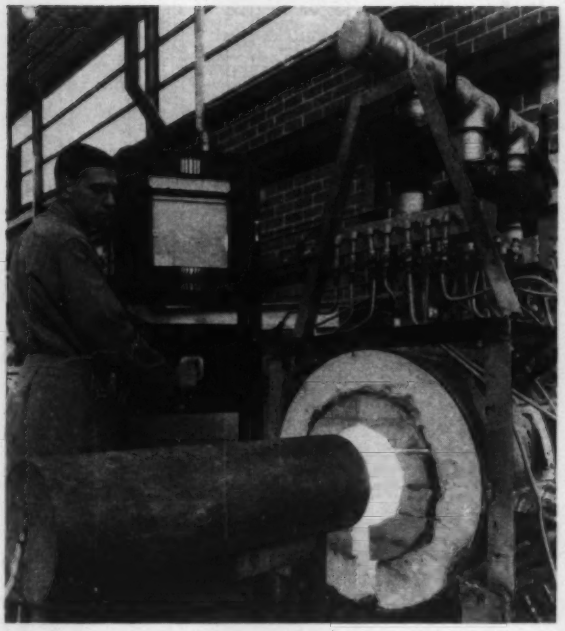
The electrical simulator can duplicate variations in conductivity of the material under study, as its temperature changes. Time can be stopped in the simulation, so readings can be taken, changes made in some of the conditions, and other readings taken representing the same time. Then the simulation can be moved to another time and other "simultaneous" readings taken.

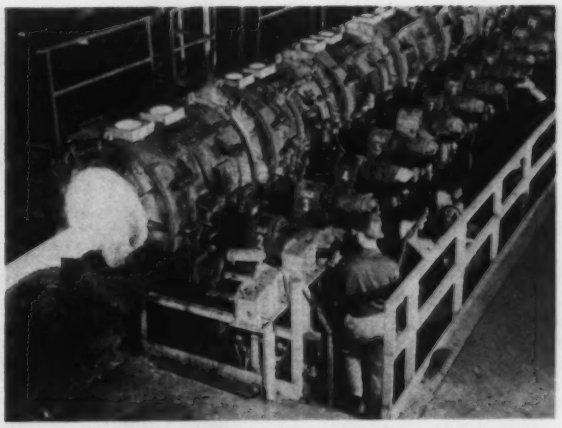
Typical problems: Calculation of the time required for a molten bath of aluminum to return to a particular temperature after a cold piece has been introduced, or determination of isotherms in shadows produced in a heated workpiece by the skid rails in a billet heating furnace.

Heat application problems that would require months of manual calculation can be done on the simulator in a few days, says C. L. Feng, manager of the Physics & Mathematics Dept., Selas Research Div. Time on the machine, after setup, might be only a few hours, and would depend on the amount of detail required in the solution.

The simulator may be the most used machine of its type in the U. S., says Mr. Feng. Similar units are used elsewhere, but none is known to be in constant use on practical application problems. Selas research engineers are investigating methods of direct data input, so problems can be fed into the machine in terms of heat variables. That would make it unnecessary to translate problems from thermal to electrical values.

• Selective heating—the controlled heating of part of a workpiece without causing undesirable temperature changes in other parts—can be closely investigated.





BLOOM REHEATING line is tailored to production needs with data from heat process simulation

SELECTIVE HEATING results (like the hardness of these mauls) can be forecast with the device

and experimental results

Heat Application

The simulator is useful in studying the effects of heat on metals or other materials coated with dissimilar metals or nonmetals, where specific heats are known. Example: A plastic material used as a lubricant on the inner surface of bread pans used in conveyorized ovens. Proper heat application makes it possible to cure the plastic rapidly, without causing damage, and without heating the base metal. Electric simulation helps determine how short the curing cycle can be, and it provides other useful design data.

A similar setup can be used to determine the optimum heating rates for processing ceramic material on muffler parts, or for curing finishes applied to continuous metal strip.

• The manufacturer can learn from the Thermolog what methods must be used in production to provide desirable heat patterns.

A maker of striking tools (such as picks or hammers) wanted to know if selective hardening of the striking point or face to a certain depth would give him a better product than he was getting with through hardening. He wanted to know if the new method would produce any changes in hardness pattern or mechanical properties, and if those changes would be for better or for worse.

Extensive laboratory tests defined differences between results the customer was getting and what could be done with proposed rapid, high gradient heating, water spray quenching, and short cycle tempering. It was found that all operations could be carried out continuously with in-line production heat processing equipment, which used radiant gas heat sources and provided close control over hardness patterns.

Now, that same problem can be analyzed in greater detail by substituting simulation for much of the trial and error testing and manual calculation formerly required to evaluate each processing method.

• Companies with other types of heating problems can also get faster, more detailed solutions.

In steady state problems, which involve heat exchangers or other equipment in which fluid is heated through pipes, the simulator helps determine conditions needed to stabilize heat transfer. Thermal stress problems are solved to tell how fast heat can be applied for uniform heating without damaging the workpiece.

Properties of materials can also be determined with the simulator. Measurable values (like temperature, or expansion rate when heated) are fed into the circuitry, so other unknowns in the Thermolog equation can be calculated.

Plastics Take 5000° F Plus In Rocket Nozzle Tests

U. S. NAVY tests of filled phenolic parts such as rocket nozzles show good results at temperatures above 5000° F, say E. H. Bartel and R. J. Landry of the U. S. Naval Ordnance Station, China Lake, Calif.

The phenolic resin selected for evaluation was Type 91LD. Some equivalent resins were synthesized by the test station which noted that equivalent materials were also available commercially.

- **Two types of fillers were checked.**

In powders, the Navy tried metals, metal oxides, and ceramics fine enough to pass through a 325 mesh sieve. Such fibers as asbestos, glass, Refrasil, graphite, and quartz were tried.

Of the powdered fillers, the best results were reported with zirconium boride, zirconium oxide, and titanium carbide in combination with the 91LD phenolic resin.

The test station said the quartz fibers were highest performers—although asbestos fibers did well with a lesser degree of orientation—and were more easily molded into nozzle insert shapes. Fibrous materials that were oriented perpendicular to the gas flow handled erosive conditions best.

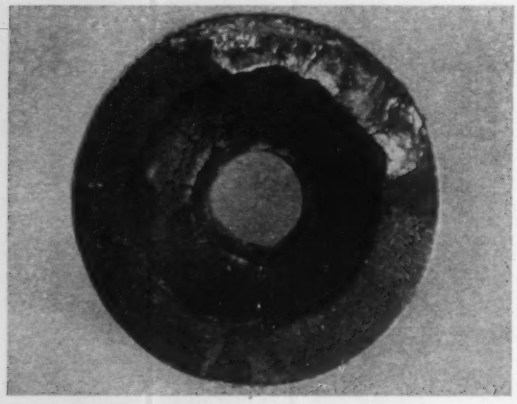
- **Materials selected for evaluation were fired in a miniature rocket motor which also approximated the environments of jet vanes, jetavators, and motor tube liners.**

These were the conditions under which the tests were conducted:

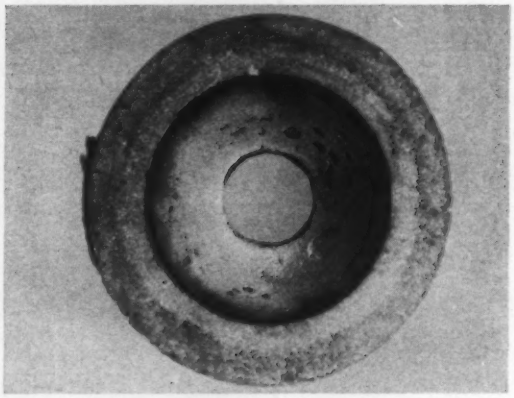
Temperatures above 5000° F, gas velocities above 10,000 ft per second, and assorted debris from the propellent such as metals, oxides, carbides, and nitrides—frequently in solid form—plus erosive and ablative materials such as burned out igniter cases, motor seals, and unburned propellent expelled during the firing cycle.

Phenolic resins containing these powders showed the best results . . .

ZIRCONIUM OXIDE—Firing time: ½ second

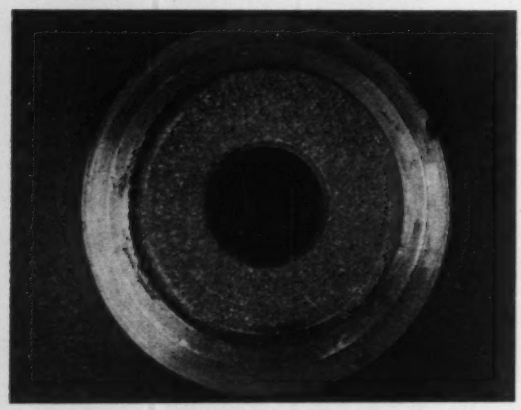


ZIRCONIUM BORIDE—Firing time: 3 seconds



Asbestos felt-phenolic laminates ablate uniformly without cracking

BEFORE FIRING



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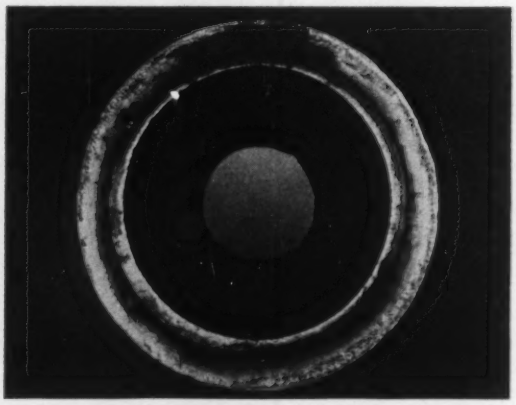
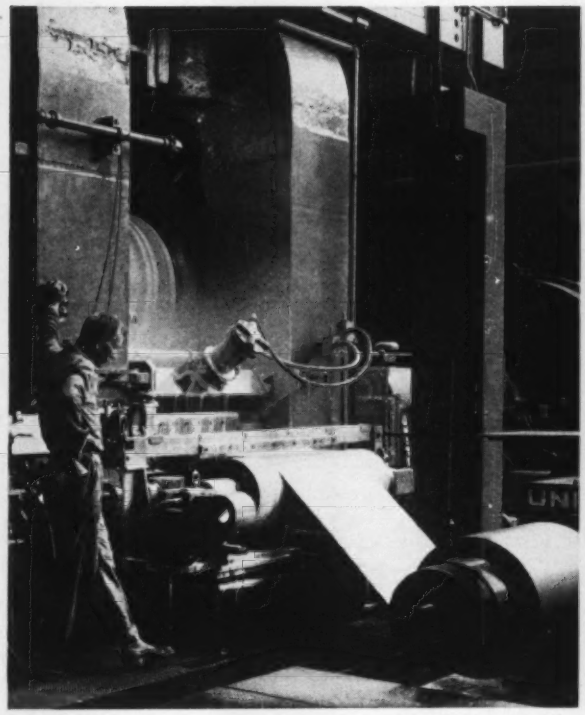




METALWORKING — Kentucky's No.1 Industrial Activity

KENTUCKY offers the metalworking industry many unusual advantages. That's why fabricated metal and machinery make up Kentucky's biggest industry . . . why employment in this industry has increased 64% in the past ten years. In fact, Kentucky's 42,000 metalworking jobs account for more than one-fourth of all manufacturing employment in the State. And in 1958, value added to products by 295 Kentucky metals and machinery manufacturers totaled more than $490,000,000.

Metalworking companies are discovering that Kentucky offers maximum opportunity for progress and profits:

Kentucky is at the center of your markets with 68.4% of the nation's population within 500 miles, 50.7% within 400 miles, 38.1% within 300 miles. Thus, metal products manufactured in Kentucky can be delivered to your customers faster and at lower costs. Kentucky has a tremendous pool of responsible, easily-trained people eager to work. Great resources of natural and man-made raw materials are readily available . . . coal, water, oil, natural gas, electric power.

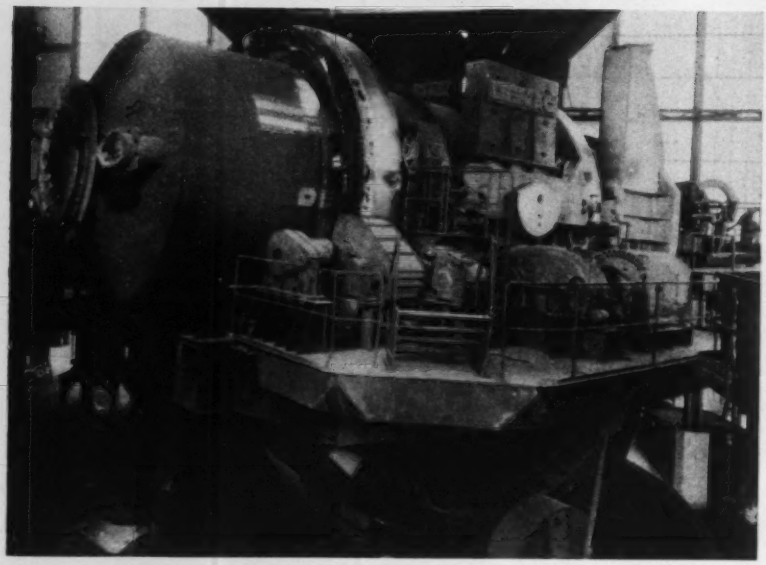
Combine these important factors with Kentucky's favorable business climate, its record number of financial plans for new and expanding industries . . . and you can readily understand Kentucky's impressive growth in the metals and machinery industry.

Let us give you more reasons why Kentucky industry is growing 55% faster than the national average. Tell us your needs, and we will send you a complete, professional analysis of Kentucky's ability to fulfill them. Your inquiry will be held in strictest confidence. Address:

Lieutenant Governor Wilson W. Wyatt, or
E. B. Kennedy, *Commissioner,*
Kentucky Department of Economic Development
800 Capitol Building, Frankfort, Kentucky

COMMONWEALTH OF
KENTUCKY

WHERE BIG THINGS ARE HAPPENING



Rotor Steelmaking Furnace

Minimizes Charged Scrap

THE NEED for quality steel and a shortage of domestic scrap for open hearth steelmaking helped South African Iron & Steel Industrial Corp. Ltd. (Iscor) to decide on Rotor furnaces when more melting capacity was required at the company's Vanderbijlpark and Pretoria Works.

The furnaces, said to produce steel equal to that made in basic open hearths, are turning out 100 ton heats. They add over half a million ingot tons to Iscor's annual capacity. Both steelmaking facilities were built by Demag A. G., Duisburg, Germany.

• Oxygen of relatively low purity can be used in the furnaces. The air pollution level is said to be low.

The Rotors are using oxygen with a purity of 95 per cent or less and turning out steel that contains less than 0.004 per cent nitrogen. Most other pneumatic processes require oxygen that is at least 99.5 per cent pure—and much more expensive.

Iron ore is used instead of scrap to cool the heat. Metallic iron produced by direct reduction in the furnace is said to cost less than the same amount of molten pig from the blast furnace.

The company expects to get good ingot yield from molten iron refined in the vessels. And oxygen consumption has been low in heats produced to date.

• The furnace rotates on a horizontal axis. Oxygen is blown into the bath through one lance and over the bath through another line.

Each furnace consists of a refractory lined, cylindrical vessel, about 50 ft long and 15 ft in diameter, with openings at both ends. The vessel rotates around its longitudinal axis at 0.2 to 4 rpm.

Oxygen for decarbonization of the molten iron arrives in two lines. Primary oxygen (about 95 per cent pure) is blown through a water cooled nozzle beneath the surface of the metal bath. That converts carbon in the pig iron to carbon monoxide and creates a turbulence in the bath. Secondary oxygen (of lower purity) is blown over the surface of the bath. It combines with the carbon monoxide and provides additional reaction heat.

Temperatures produced when the carbon monoxide is burned would cause severe roof damage in a stationary furnace. But the slow rotation of the cylindrical vessel exposes a constantly changing refractory surface to the flame. And the heated lining is cooled as it passes under the bath of molten iron. It's cooler than the flame above.

• Turntable and cradle mounting makes it possible to apply lances from either end, tilt the vessel during the blow, and replace the vessel rapidly.

End openings of the vessel are identical. The turntable makes it possible to position either end of the furnace at the charging, lancing, or tapping stations, on the furnace platform. The vessel can be tilted slightly to increase bath depth at the blowing end—to protect partially burned out lining.

Each of Iscor's melt shops is equipped with two vessels, so one can be relined while the other is in use. When lining is burned beyond use, the furnace cradle is tilted to the vertical position. The vessel is placed upright on a carriage and withdrawn for relining. The relined unit is secured to the cradle, moved to the horizontal position, and put into use.

METALGRAMS

. . . news of "Electromet" ferroalloys and metals

UNION CARBIDE METALS

MARCH, 1961

NEW COLUMBIUM ALLOY -- In recent months, interest has increased in columbium-treated carbon steels for structural applications. Small amounts of columbium sharply increase the yield and tensile strengths of these steels by promoting a fine-grained structure. The element also improves weldability. Highly soluble columbium additions to these steels can now be made with new high-silicon ferrocolumbium. By dissolving faster than regular ferrocolumbium, the new alloy promotes improved uniformity and control of columbium in steel. Ask your Union Carbide Metals representative for further information.

* * *

ZIRCONIUM -- AN ACTIVE ELEMENT -- Zirconium added to steel readily combines with oxygen, sulphur, and nitrogen. It either removes these elements from the bath or renders them less harmful. For example, zirconium reduces the hot shortness of high-sulphur steels by tying up sulphur. It reduces age-hardening in deep-drawing steels by combining with nitrogen. Zirconium is also a strong grain refiner when more than 0.10 per cent is added to steel. Contact your Union Carbide Metals representative for more information. Also, ask for "The Elements That Surround Us: Zirconium" in the Fall 1960 issue of UNION CARBIDE METALS REVIEW.

* * *

A WORLD-WIDE SEARCH -- The search never ends for high-grade ores, from which ferroalloys are made. Exploration teams of Union Carbide Ore Company search all parts of the world -- sometimes through tropical jungles, arid deserts, and unexplored rivers. Their goal: to discover new ore deposits to satisfy the growing demand for ferroalloys. Union Carbide's integrated mine-to-furnace operations assure a continuous supply of ferroalloys...when you want them. For the full story, write for the article, "From Earth to Hearth," in the Winter 1961 issue of UNION CARBIDE METALS REVIEW.

* * *

THIS 'N' THAT -- Use of ferroalloys in pre-weighed bags allows: lower handling losses, improved inventory control, more accurate alloy additions, and better control of steel composition. Write for F-20,121 and F-20,138... "Simplex" low-carbon ferrochrome is a vacuum-processed alloy for stainless steel. It features rapid solubility, low price, and extremely low-carbon content. Write for F-20,118...Manganese costs for stainless steel can be sharply cut with ferromanganese-silicon. Write for F-20,093.

* * *

UNION CARBIDE METALS COMPANY, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Ltd., Toronto.

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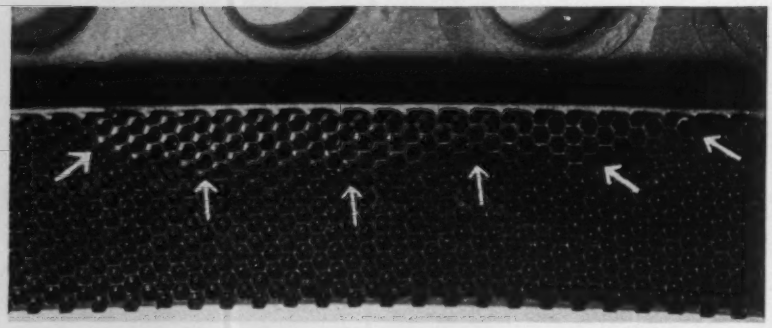
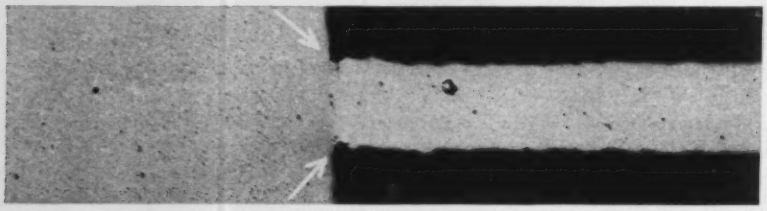
Here's a Simple Test For Open Face Honeycomb



UNBONDED areas fail to hold low surface tension liquid (arrows). Even brazes that do not look sound (below) often prove acceptable



HOW do you test the bond on brazed, open faced honeycomb? ANSWER: Fill the cells with a light liquid with low surface tension.

Unbonded areas will show up quickly (see illustration), claims T. I. Slater, supervisor of laboratory services, Large Jet Engine Dept., Evendale, Ohio, General Electric Co.

First tests were made on parts with the smallest cell size in J79 engine production. Later tests proved the feasibility of the method for the larger types with equal success.

Results: No failures in production lots of honeycomb structure during the last two years.

• Widespread application of honeycomb to jet engines made it necessary to find a fast, economical, reliable method to check brazing quality.

Well bonded cells of a given size will hold some liquids, says Mr. Slater. When bonding is not complete, the liquid will drain out.

When parts under test are removed from the bath, they are held so that the cells are horizontal to allow the excess liquid to run off. A quick visual check shows areas that fail to retain fluid.

• First performance correlations were made on turbine shrouds.

Initial quality control procedure required inspection of the turbine shrouds between initial and final testing.

Using the new dip technique, Mr. Slater checked a series of turbine shrouds prior to assembly, eliminating the need for removal after initial and final testing. A trial period of three months revealed no failures.

General Electric's current testing procedure no longer includes disassembly of shrouds after the initial run-in.

Yugoslavs Prove Out Copper Process

THE COMBINATION of continuous casting in a controlled atmosphere plus induction heat is expected to gradually replace traditional methods of producing oxygen-hydrogen free copper (OHFC), claims Ajax Magnethermic Corp., Youngstown.

The firm cites its success with an installation at Fabrika Svetozarevo, Svetozarevo, Yugoslavia, where annual production of 22,000 tons is expected to be doubled in the near future.

The Yugoslav firm melts and casts its wire bars directly from cathodes at its wire mill.

• Oxygen free copper offers greater ductility, improved fatigue resistance, less hydrogen embrittlement, and increased electrical conductivity.

Tough pitch copper contains 0.02 to 0.06 per cent oxygen, Ajax points out. When copper is freed from even such a small percentage of oxygen, quality is greatly improved.

Melting of cathodes is carried out in an Ajax-Wyatt-Tama induction furnace which keeps the molten metal well covered with a control atmosphere free of oxygen, hydrogen, and moisture to prevent contamination. The 1200 kw furnace is connected by electrically heated launders with a 100 kw holding furnace. Molten metal flows from there to a vertical reciprocating mold of a continuous casting machine.

All steps from charging to casting are automatic and continuous. Rigid temperature control is needed for proper operation of the reciprocating mold.

• The combination process has been made possible by advances in the art of continuous casting.

Tough pitch copper is usually cast in open molds. Top layers oxidize during solidification. In the continuous process, copper is completely enclosed by the mold. Metal solidifies gradually.

The product is dense and does not have inclusions.

The process was pioneered by American Metal Climax Inc., New York.

Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...

Profitability? Faced with the decision to expand your plant facilities, you should first determine whether all elements combine to form a pattern of future profitability. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete one-company service and ingenuity based on years of experience.

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Filled Nylon Washers Cut Maintenance Costs

They overcome problem in Sendzimir mills operated by Wallingford Steel; molybdenum disulfide serves as filler material

THRUST washers made from molybdenum disulfide filled nylon have drastically reduced maintenance on two Sendzimir mills at Wallingford Steel Co., Wallingford, Conn.

The problem: Thrust washers, used in roll backing assemblies failed under compressive loads and had to be replaced frequently. Average service life was less than two months. In addition, the washers damaged adjacent parts.

• The filled nylon thrust washers have been in service over four years without a failure.

Rigidity and strength of the nylon (called Nylatron GS by Polymer Corp., Reading, Pa.) prevent distortion and fracture under compression.

The lubricating qualities of the filler material prevent the friction which previously caused heat checks in bearings. Due to filled nylon's resilience, no bearings have been damaged by metal chips carried against the bearings by the washers. The resilient washer surface gives slightly to accommodate chips and particles and prevents the particles from scoring the bearing or washer surfaces.

• Before adopting the material, thrust washer and bearing replacement costs each averaged $1600 a year.

Up to 50 per cent of the washers had to be replaced every two or three weeks, depending on the number of shifts the mills were in operation. Heat buildup occurred despite the lubrication provided by 300 gpm of mineral oil, which flushed bearings, backing assemblies, and roll clusters on the Sendzimir mills.

Backing assemblies in the mills support the intermediate and work rolls, keeping the rolling pressure constant to control the gage of the strip. Smooth, reliable operation of the backing assemblies is essential to control gage. Typical products: Specialty alloy stainless steel foil in thicknesses of 0.00075 to 0.005 in. for the automotive, aircraft, missile, and other industries.

Each mill mounts eight backing assemblies. The assemblies comprise steel roller bearings and saddles mounted alternately on a nonrotating shaft. There are six bearings per shaft on the large mill and four bearings per shaft on the small mill. Thrust washers are mounted at the ends of each bearing—a total of 48 washers on the large mill and 32 on the small unit. Washers on the large mill measure 8 1/16 in. OD x 6 27/32 in. ID x 0.132 in. thick. On the smaller mill: 5 11/16 in. OD x 3¾ in. ID x 0.132 in. thick.

Electron Beam Weld Shows Light Touch

Joining metal right next to a glass collar demonstrates versatility. Equipment maker cites other advantages

THE ABILITY of electron beams to weld without overheating metals solved a ticklish joining problem for a maker of high vacuum equipment, NRC Equipment Corp., Newton Highlands, Mass.

The problem: Weld two parts of a vacuum feed-through nipple without cracking its glass insert.

So far, says NRC, results have been practically perfect. Each seal is neat, strong, and withstands baking temperatures exceeding 500° F. Parts are no longer rejected.

• To reach ultralow pressures, "super" vacuum chambers must be heated. Soldered joints won't hold up, so alternate methods must be employed.

In attempting to make a vacuumtight joint which would stand bake-out temperatures, brazing and other welding techniques were tried. Each broke the glass collars on the feed-through nipples.

NRC took advantage of its electron beam welder. Welds were made one at a time. Each nipple was held in a universal fixture at an angle of about 50 degrees and rotated. Welds were made with a setting of 15,000 volts and 5 to 10 milliamperes while the fixture turned at 3 rpm. A copper chill cap on the top of each seal helped to dissipate heat.

Welding time was about 20 seconds; total elapsed time was about 8 minutes, including time for fixturing and evacuation of the weld chamber. (NRC points out that welding time could have been reduced to less than 30 seconds per part by employing a 12-position fixture and one operator for several welding machines.)

• NRC cites several advantages for the electron beam system.

The welders are being employed in electronic, electrical, and missile industries for refractory and reactive metals and alloys. Other advantages listed by NRC include:

1. Impurities evaporate from weld metal as the bead is formed.
2. The heat affected zone is exceptionally small.
3. The ratio of weld depth to width can be 4 to 1 with excellent penetration.
4. Unusual welds can be made in tight places: Example: A precision weld at the bottom of a 1/16 in. slot.

NRC also points out that electron beam method has been gaining favor in areas where production items must be permanently evacuated. Vacuum reference chambers, electronic equipment, and fuel elements for atomic reactors are being welded regularly with the equipment.

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Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
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Dayton Mall. Iron Co., Ironton Div., Ironton
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National Mall. and Steel Castings Co., Cleveland 6

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Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
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Meadville Malleable Iron Co., Meadville
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TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
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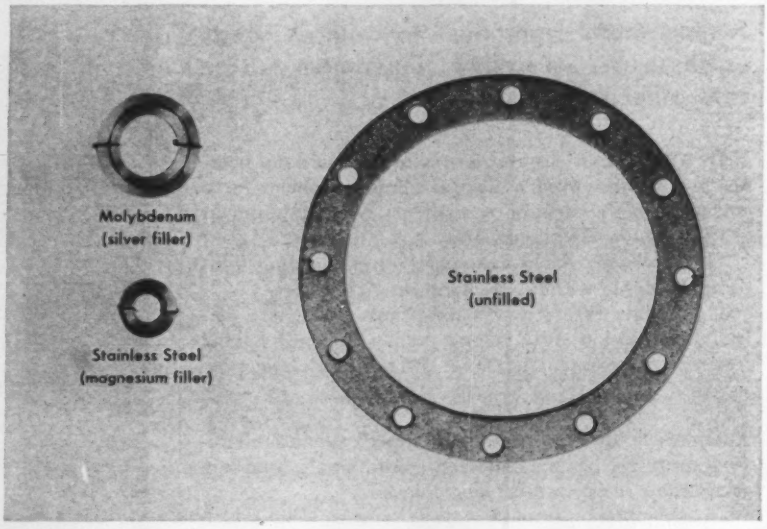
These companies are members of the Malleable Castings Council

Fiber Metal Passes Tests In Seals . . . and Gaskets



COMPOSITE MATERIALS that combine the desirable characteristics of their components are said to be suitable for static seals at temperatures up to 1200° F and pressures of 5000 psi. The materials are also being tested in dynamic seal applications.

The materials are made by impregnating a porous body of fiber metal with a softer material. They were developed by Armour Research Foundation, Illinois Institute of Technology, Chicago, for Materials Central, Wright Air Development Division, U. S. Air Force.

• Resilience of the skeleton combines with the filler's conformability, providing an effective seal for most static, high temperature, high pressure applications.

Fiber and filler for static seals are made of corrosion resistant metals, so they can be used with chemicals, exotic fuels, or hydraulic fluids.

Skeletons are usually made by felting molybdenum or stainless steel fibers, compressing them, then sintering to bond the fibers at all contact points. The skeleton can be made as dense as desired. It can be machined to shape while temporarily impregnated with salt.

When the skeleton is filled, the composite consists of two, continuous metal networks—virtually a sponge within a sponge.

• Static seals have undergone exhaustive tests; materials are being studied for dynamic applications.

The temperature a seal can stand is dependent on the melting point of the filler. A molybdenum fiber skeleton filled with silver retained air at 1200° F, at pressures pulsating from zero to 5000 psi. In other tests, the same material was subjected to temperatures cycled from about 72 to 1000° F, also with pulsating pressures from zero to 5000 psi. No leakage or loss of bolt torque was noted after three such temperature cycles.

Seals made of the molybdenum-silver composite held hydraulic fluids for 93 hours and almost 337,000 impulse cycles at 1000° F, in tests done by Republic Aviation Corp. The tests included repeated assembly and disassembly and 12 thermal cycles.

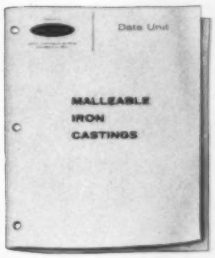
Dynamic seals made by impregnating metal skeletons with polymeric materials have performed well in preliminary tests.

New Cars and Trucks Use More Malleable For Better Performance...Lower Cost

As the automotive industry steps up its drive to pack greater performance into lighter weight vehicles and still hold costs in line, the demand for Malleable iron castings continues to increase. Noted for their strength, toughness, machinability and economy, Malleables are used as key components in every make and type of vehicle.

Matching each new advance in automotive technology, Malleable is now available in a broad range of properties, including tensile strengths from 50,000 to 120,000 psi!

Find out now how much Malleable castings can improve your products. Contact any company that displays this symbol —



For Free Literature on advantages of Malleable iron castings, with examples from the automotive industry, ask any member company for Data Unit No. 113, or write to Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

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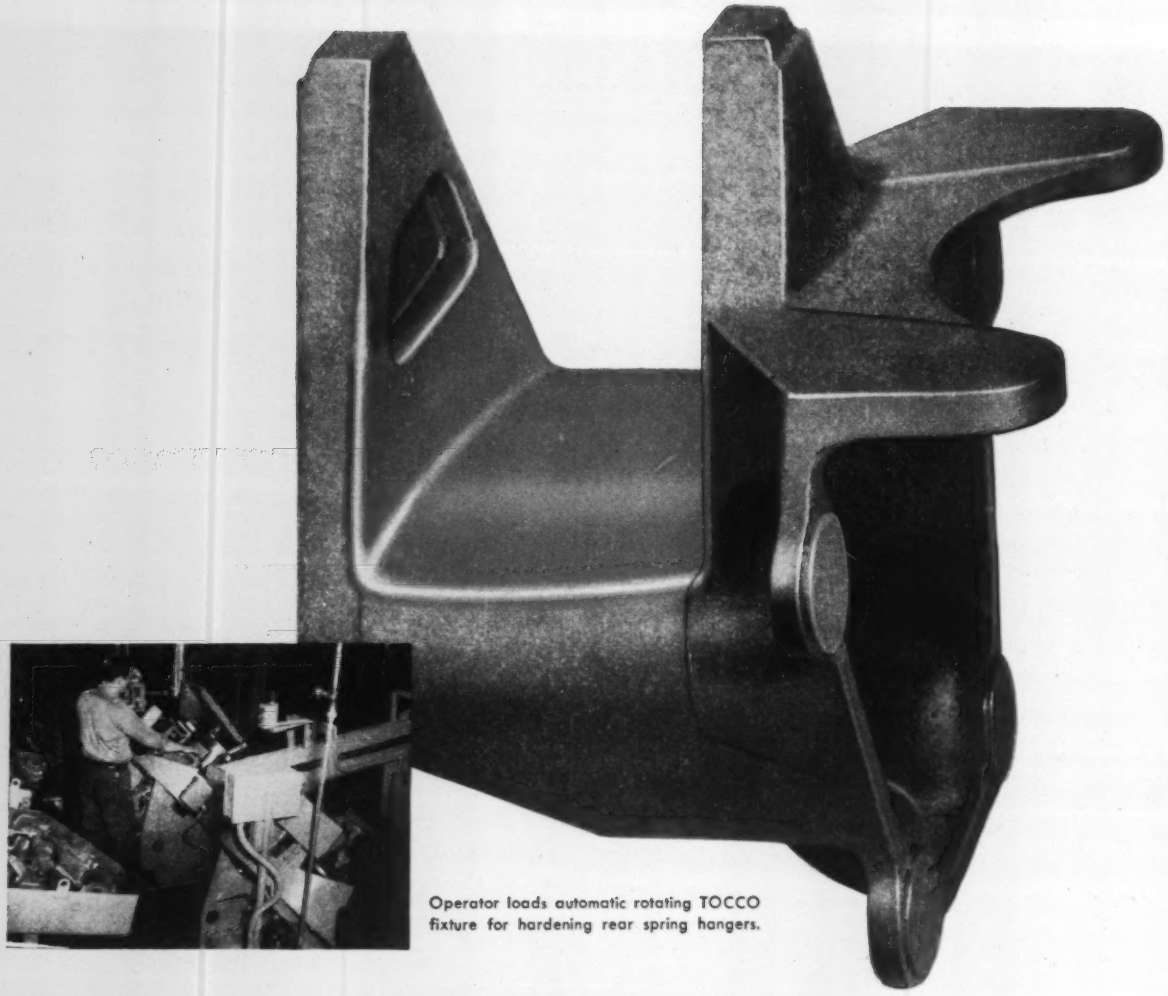
Testifying to Malleable's outstanding ability, pearlitic Malleable iron crankshafts are now used in both cars and trucks, like this new heavy-duty highway hauler. Pearlitic Malleable was chosen for its high strength, wear resistance, damping capacity and machinability . . . Malleable is the most machinable of all ferrous metals of similar properties.



Operator loads automatic rotating TOCCO fixture for hardening rear spring hangers.

The job they said "couldn't be done"

now being hardened—1 every minute

with TOCCO* Induction Heating

This unusually shaped part is a rear spring hanger used in the spring suspension system of a major truck manufacturer. The hardness pattern covers the "flat" section, which actually isn't flat but blends two widely varying radii, and the sides or "ears" a portion of which must be hardened to the same depth—.060" to .090". Nine of these irregularly shaped castings are loaded in a rotating fixture and scanned progressively by a TOCCO inductor block at the rate of one per minute. An air gap of .060" is maintained between the inductor and the part—quite a tricky achievement since the spring hangers are unmachined castings with normal foundry tolerances of ±.045".

This job is typical of many where TOCCO engineers have worked out a satisfactory and reliable production setup for a supposedly impossible heating job. If you have a difficult heating job—hardening, brazing, soldering or heating for forming or forging it will pay you to consult TOCCO—without obligation, of course.

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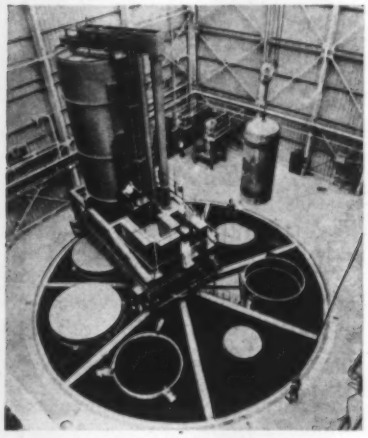
Assembly Change Saves Company $7000 Yearly

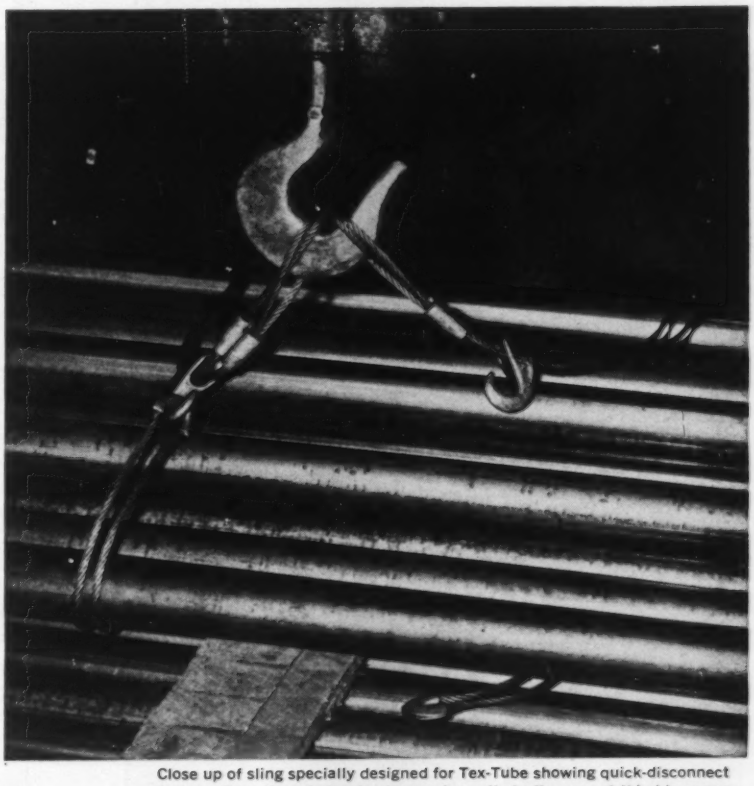
Elimination of a taper reaming step in making calculator counter dialshafts has saved $7000 per year for Friden Inc., San Leandro, Calif. It was done by using a tubular spring pin.

As many as 11 of the tubular pins are used in a single calculator. Although they cost less than the former tapered pin, the biggest portion of the saving comes from elimination of the taper reaming step in making the hole, Friden reports. Further reduction in cost has come from the fact that the pin does not protrude, so no filling is needed to remove projections.

Pins are set in an arbor press with a special fixture, simplifying assembly and contributing further to savings. Compression of the spring as it is forced into the hole makes it self-locking; there have been no reports of loosening in service. Material used is heat treated, high carbon spring steel. Standard pressure is all that is needed to set the spring pin, so no distortion occurs.



LAZY SUSAN PIT arrangement is used on this $1.25 million gantry furnace to heat treat rocket cases and jet engine hardware at the Flight Propulsion Laboratory Dept., Evendale, Ohio, General Electric Co. The 44 ft, cylindrical, high temperature furnace revolves over the pit which contains two furnaces for combination preheat, tempering, and stress operations. Salt, still air, and water rinse quench tanks, and a loading station also are housed in the pit together with atmosphere control equipment



Close up of sling specially designed for Tex-Tube showing quick-disconnect feature. Traveling choker hooks can be pulled off crescent thimbles once the load of pipes has been lowered. Sling can then be easily removed from under the load with minimum of load damage.

TEX-TUBE'S method of pipe handling improved with CF&I-WICKWIRE SLINGS

Handspliced slings that are used to "choke up" long, heavy loads of pipe have a tendency to unlay as they are pulled out from under the load.

Tex-Tube, in cooperation with CF&I-Wickwire's Houston Sling Shop, came up with an entirely new sling assembly, (pictured above), which provides a quick-disconnect feature without the disadvantages previously encountered.

Art Pitkin, Tex-Tube Purchasing Agent, says: "This sling improved the safety of our pipe-handling operations and reduced the possibilities of marking the pipe. We've been using it successfully for several years."

CF&I-Wickwire can help solve *your* sling problems. For details on our complete line of standard or custom-designed slings and wide range of sling assemblies and fittings, send for your free copies of Folder WR-729 (Wire Rope Slings) and Folder WR-744 (Swing Slings).

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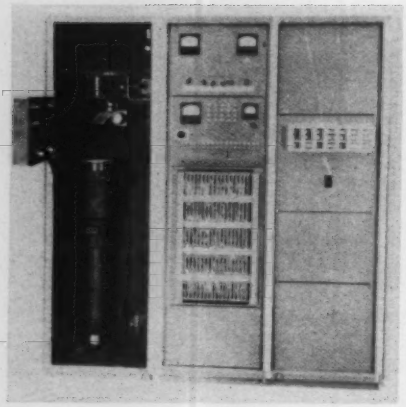
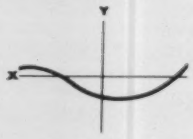


How to Make Instant Mechanical Drawings

New 'readout' improves control of mind over matter

AXIS GENERATOR



Trained draftsman-operator inserts drawing specifications into computer through switching panel. Information then passes through logic circuitry, output of which goes through an axis generator (left). It draws horizontal and vertical graph axes any place on the display area

STRAIGHT LINE GENERATOR

$$X=A\left[Z+Y\right]$$

Signals then pass through a vector generator which draws straight lines electronically through any two points regardless of angle. A typewriter simulator permits printing of entire pages of text or data. A tube driving circuitry changes mathematical data into graphs (analog)

IMAGE PRODUCTION

Information is displayed on the screen of a cathode ray tube called a Charactron. It eliminates hand plotting of computer outputs. A high speed (35 mm) camera photographs the tube image for permanent record and can include superimposed forms stored in a projector

CAMERA-PROJECTOR

A second camera, complete with processing tank, projector, lamp, and viewing screen, automatically reproduces Charactron images in less than 8 seconds. It permits a designer to view his drawing for checking purposes

PICTURE the design engineer of tomorrow:

He's seated at a desk, dictating specifications into a microphone. The drawings are made automatically, then displayed on the TV monitor on his desk.

After he checks the dimensions of the completed drawing, he pushes a button.

Some distance away, a completed control tape is inserted into a machine tool which proceeds to turn out the part.

Total time from concept to finished part: A few minutes.

• **That "dream" is about 90 per cent reality now. Starting with information provided by a computer, complex engineering drawings that formerly took hours are being completely drawn, recorded, and reproduced for checking in a few seconds, claims General Dynamics/ Electronics, San Diego, Calif., a division of General Dynamics Corp.**

The latest model recorder will provide detailed multiview drawings in any of three dimensions and any cross section you may want. They will be complete with curves, lines, symbols, dimensioning, even printed forms.

Says L. H. Orpin, general manager of the division: "This concept opens new design horizons. It will substantially reduce design time, conserve engineering effort, and eliminate costly mistakes in automated manufacturing."

Math formulas which require descriptive geometry for presentation and drawings of such complex structures as ship hulls or airplane wings are quickly and easily made and displayed, claims the firm. Di-

mensions and other critical data are superimposed simultaneously.

• A computer is programed with contours and specifications of a part needed in a design. Information from the computer passes through a "recorder" which in turn makes the drawings.

First, a designer decides what kind of a part he wants and spells out its specifications. A part programer transfers that information into computer language—in this case, a numerical code developed for automatic machine tools. The operation takes about half an hour.

The computer stores all the specifications as mathematical formulas and on command releases them to a recorder (S-C 4020) as a magnetic tape with all the part specifications. When the data are run through the recorder, they produce the mechanical drawings.

Within the computer itself, data run through a logic circuitry, an axis generator (it produces the x and y axes of a drawing), a vector generator which draws a straight line between any two points electronically, a typewriter simulator (for dimensions and identifving markings), and the TV tube driving circuitry (it changes digital information to analog type required to express mathematical formulas as curves and lines).

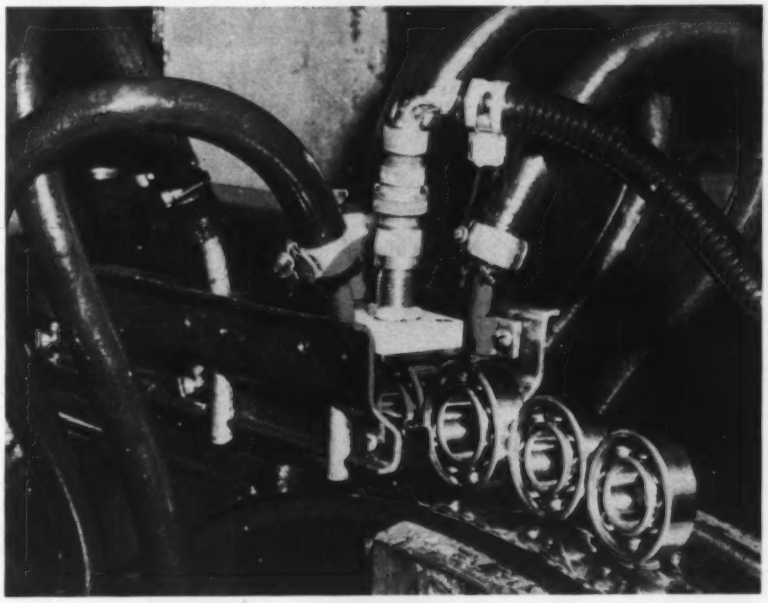
Once the image shows on the shaped beam TV tube (called a Charactron), a microfilm camera permanently records the image for filing. Other devices may superimpose a business form, or reproduce the TV image for quick viewing on a 2 ft screen so the designer can get an instant check on his design.

Once verified, the same magnetic tape that produced the drawing is used to make a tape for a numerically controlled machine tool.

The computer and related equipment costs $200,000; usually, firms rent the equipment for $5000 a month. Convair Astronautics, another division of General Dynamics, for example, employs the equipment to analyze complete flight patterns of Atlas missiles. Data (including the opening and closing rates of valves and pump speeds) are presented as graphs from tape sent from Cape Canaveral and other launching sites.

Automation installation is completed when

Switch Closes Counting Gap



wet bearings from washer pass proximity unit

A No-Touch sensing system is used to count wet bearings at Canadian SKF Co. Ltd., Toronto, Ont.

The firm washes more than 30,000 ball and roller bearings every 8 hours on two, band-type washing machines. Electronic counting completes the automation of the operation. Formerly, the count was estimated by weight.

• Proximity switches are an economical way to do the job, says Canadian SKF. Sealed contact switches are sometimes employed in such cases, but the Canadian firm found that they required too much activating force.

Two proximity units are needed. Each has a sensing unit, or pickup, a connecting cable, and a proximity control unit.

Each pickup is connected to a device called a Hartley oscillator located a short distance from the washers.

When a piece of metal (ferrous or nonferrous) gets near the sensing unit, it alters the electrical values in the circuit, stopping the oscillator. That permits an output tube to activate a relay and an electronic counter.

• At Canadian SKF, the proximity pickups are mounted at the exit chute of each washer. As a bearing passes by, it sends an electrical pulse to the counter.

The units operate most efficiently if a few basic procedures are observed, says the firm. By mounting the proximity pickup close to the bearing runway, the actuating adjustments for top sensitivity can be made with a screw driver.

Proximity switches can detect relatively small parts. For example, the devices can spot a 1/16 in. piece of aluminum foil at close range. Closeness of sensing units is influenced by metal area—for large parts that could be more than 6 in.

The counting equipment was made by Electro Products Laboratories Inc., Chicago.

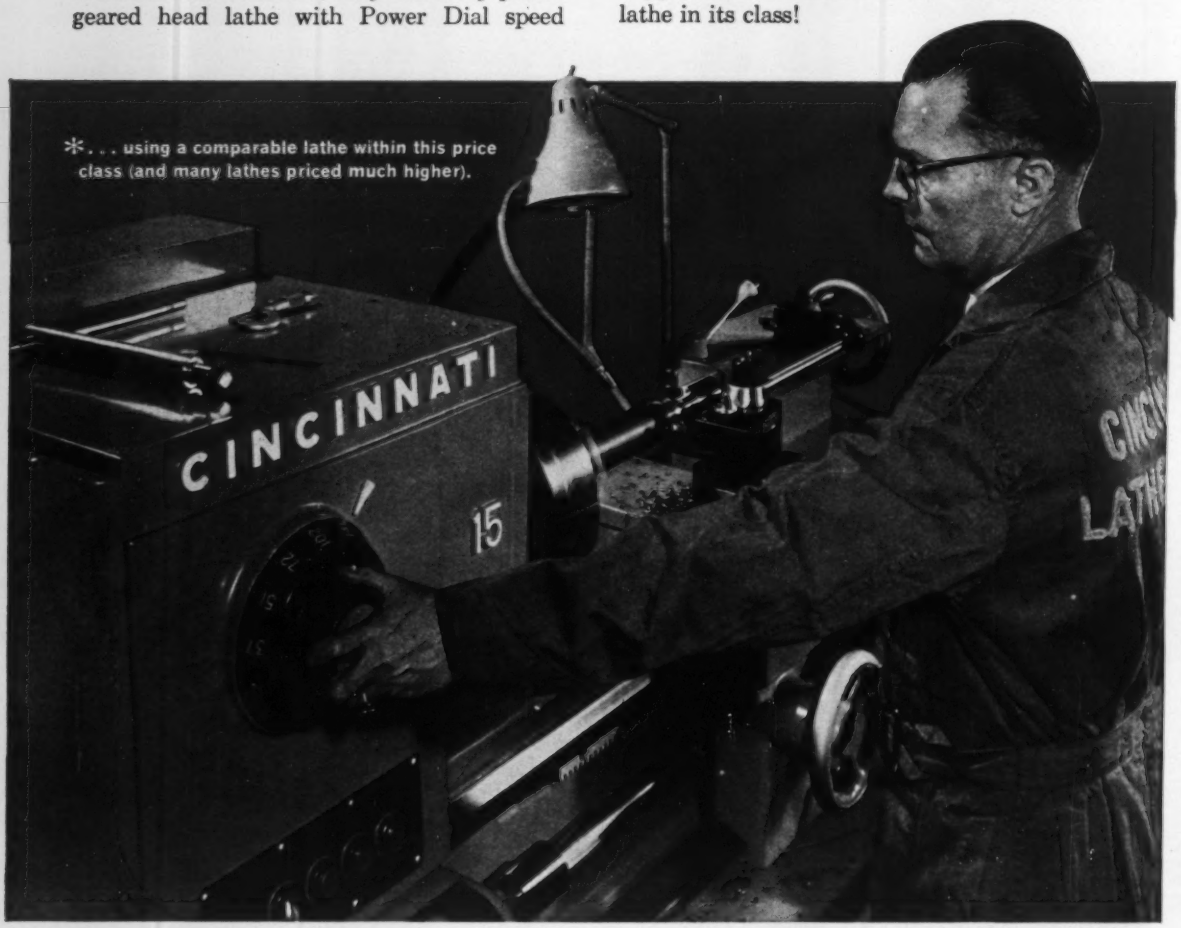
Don't gamble on lathe work!

Get cost-reducing HYDRASHIFT to insure profits on your present jobs . . . better bids on new jobs

With a Cincinnati HYDRASHIFT, your man can out-produce *any* other lathe operator!* That's because he keeps the machine cutting full time. *He loses no speed-changing time!* And, because it's *easy to change speeds*, he'll use the best RPM for every operation.

HYDRASHIFT is the *only* economy-priced geared head lathe with Power Dial speed shifting! The next desired spindle speed is dialed while the lathe is cutting. At the end of the cut, hydraulic power shifts the speed without the operator leaving the apron.

In addition, HYDRASHIFT has all the other Cincinnati features for speed, accuracy and ruggedness that make it the "most-wanted" lathe in its class!



Ask your Cincinnati Lathe and Tool Distributor for Catalog T-230, or write us direct.

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HYDRASHIFT Lathes / CINCINNATI Drilling Machines / SPIROPOINT Drill Sharpener

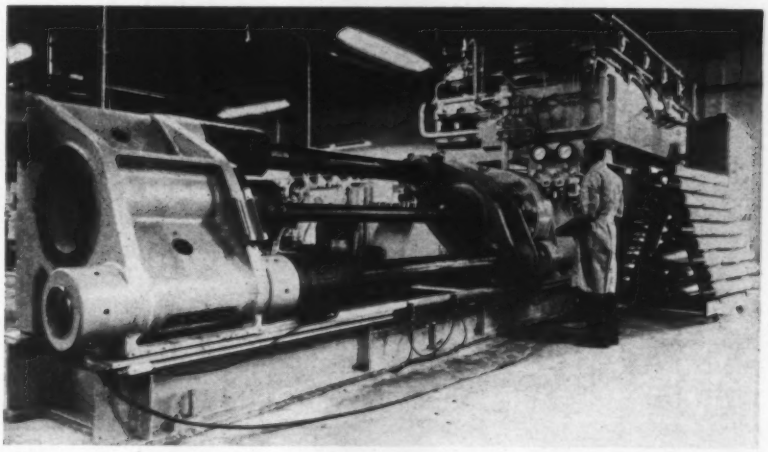
CINTIMATIC Numerically Controlled Lathes and Drills

Cold Steel Impact Press Extrudes Precision Tubes

THIS hydraulic press is capable of producing precision tubular products by the cold steel impact process. Welding or finish machining is not required. Wall tolerances can be held to 0.005 in.

The unit can extrude either open or closed end tubes up to 14 in. in diameter and 10 ft long. The company says the technique produces finished dimensional parts with increased strength. Vanes, bosses, lugs, and other projections can be made as integral parts.

For further information, *write* Matthews Corp., 12923 S. Cerise St., Hawthorne, Calif.



Unit Designed for Assembly and Inspection Jobs

THE MODEL 60 machine is intended for assembly work and can be designed around many of the recommendations of companies operating automatic equipment.

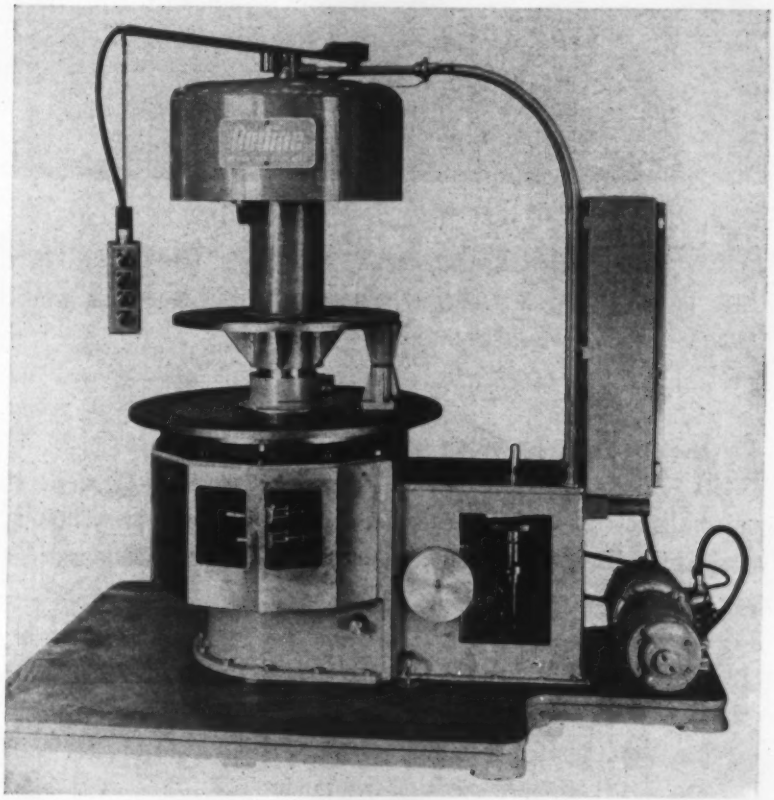
It can be used for the assembly of a large number of components combined with in-process, stage by stage, inspection of the assembly.

Coining, staking, crimping, and inserting operations are performed from the moving tooling platform without auxiliary power source.

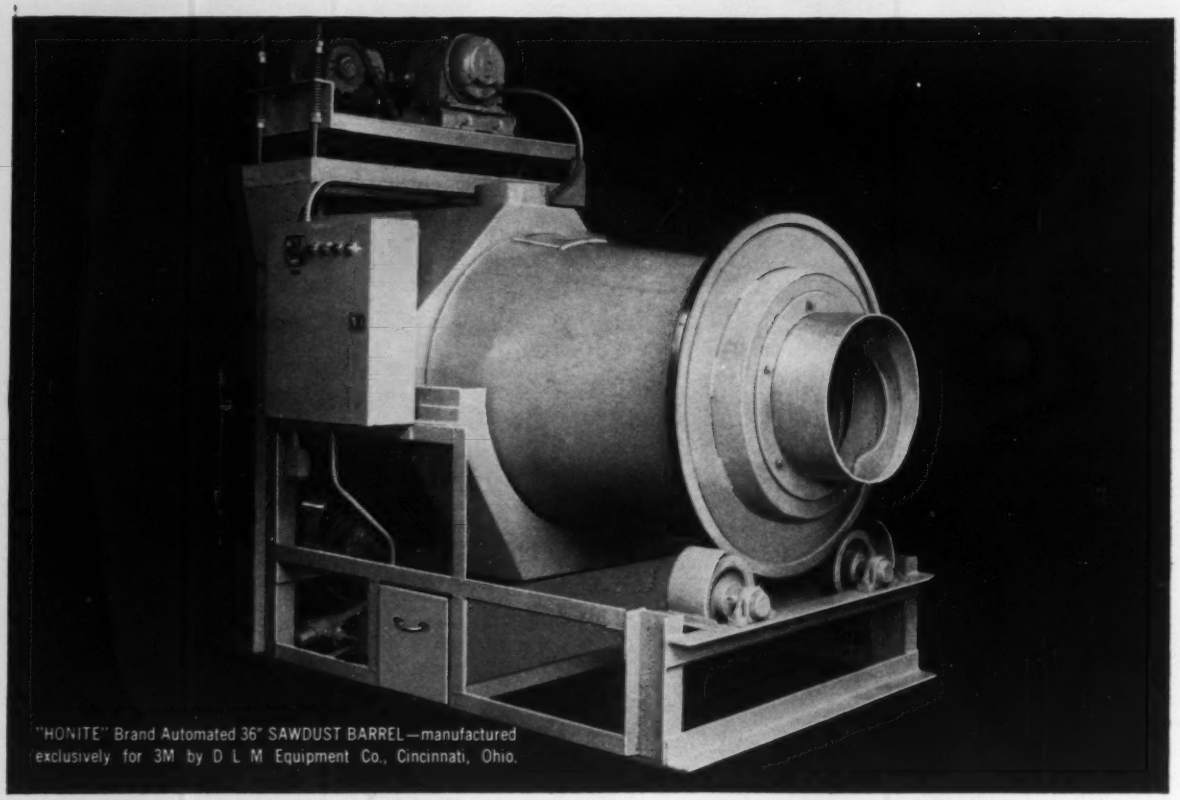
Tooling can be mounted inside, outside, above, and below the indexing worktable with power take-offs in all tooling areas. Automatic lubrication is standard. If required, an approved, explosion proof, electrical control system for use in hazardous areas can be furnished.

Indexing and tooling motions are controlled from a central camshaft. Pickoffs from the central camshaft power auxiliary camshafts and sprockets to actuate tooling (timed directly with the main camshaft). The company says this avoids timing and control problems.

The machine is available as a bare chassis or completely tooled



NEW FROM 3M



"HONITE" Brand Automated 36" SAWDUST BARREL—manufactured exclusively for 3M by D L M Equipment Co., Cincinnati, Ohio.

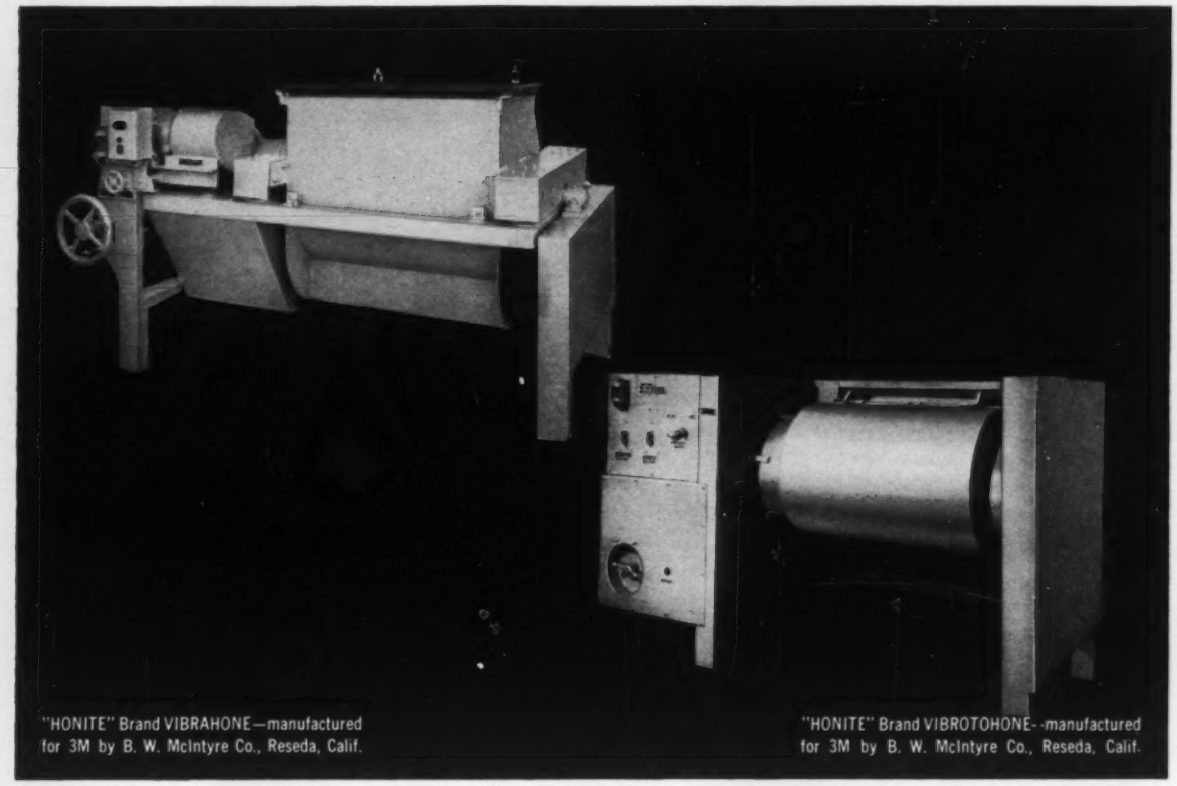
AT LAST, now from one source—3M—a complete line of "HONITE" Brand vibrating, rotating and automated barrel finishing equipment. Choose from more than 100 models, all embodying advanced engineering concepts to insure efficient, trouble-free operation.

AUTOMATED EQUIPMENT Your "HONITE" dealer has access to a completely new facility—one which provides semi-automated or completely automated barrel finishing equipment plus a custom-engineering service geared to plan and install entire systems of automation in your barrel finishing department.

"HONITE" automated equipment may be completely custom-built to suit your needs, or, in some instances your existing equipment may be automated. Standard "HONITE" automated equipment is also available, such as the 36" Sawdust Dryer pictured above. In its completely automated form, this machine performs loading, drying and polishing, media-part separation and unloading automatically.

"HONITE" AND "3M" ARE REGISTERED TRADEMARKS OF THE 3M CO., ST. PAUL 6, MINN.

. . . A COMPLETE LINE OF BARREL FINISHING EQUIPMENT



"HONITE" Brand VIBRAHONE—manufactured for 3M by B. W. McIntyre Co., Reseda, Calif.

"HONITE" Brand VIBROTOHONE--manufactured for 3M by B. W. McIntyre Co., Reseda, Calif.

VIBRATING EQUIPMENT

"HONITE" Brand vibratory equipment features two machines: VIBRAHONE, a tub type vibrator and VIBROTOHONE, a barrel type machine offering three distinct finishing actions —vibration, rotation, and vibration with rotation.

Unlike conventional vibrating equipment, these machines employ no springs but are supported by a revolutionary rubber-mount system. As a result more than 98% of the finishing force generated occurs within the barrel or tub. This is the most concentrated force in barrel finishing.

ROTATING EQUIPMENT

Choose from more than 92 models of the latest in barrel finishing machines—a wide variety of capacities and sizes.

Why settle for partial service on your barrel finishing needs? Now you can get the machines, media and methods from one dependable source. For information or sample processing of your materials, contact your "HONITE" Field Engineer or distributor or write: 3M Co., "HONITE" Division, Dept. HAF-31, 900 Bush Ave., St. Paul 6, Minnesota.

Honite

MINNESOTA MINING AND MANUFACTURING COMPANY

. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

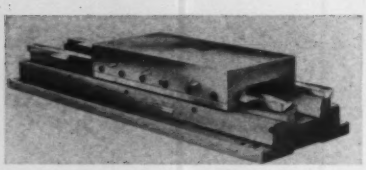
to customer requirements. Other dial type, multiple operation machines are available.

For further information, *write* Bodine Corp., 317 Mountain Grove St., Bridgeport 5, Conn.

Slide Assemblies Save on Special Production Units

PRECISION slide assemblies made by Gilman permit important time and cost savings when building up special production equipment, the company says.

The assemblies have hardened steel ways and are designed for heavier loads and longer maximum stroke lengths than Gilman dovetail slides. Cross section areas are more massive and saddle working surfaces are larger. Saddle widths: 9, 11, and

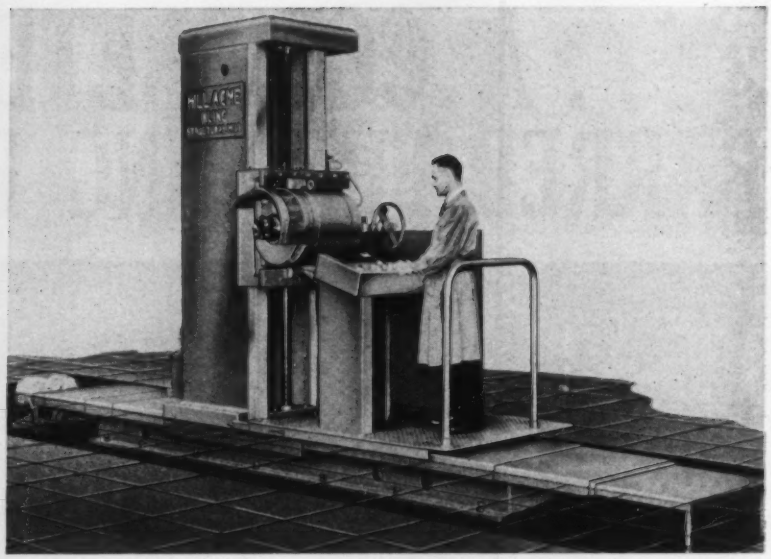


15 in. In each saddle width series, you can choose from four saddle lengths and three base lengths. Standard saddle working surfaces range from 9 x 9 in. to 15 x 60 in. Maximum stroke lengths up to 45 in. are available.

For further information, *write* Russell T. Gilman Inc., 623 Beech St., Grafton, Wis.

12 in. Cutoff Machine Handles 1½ in. Steel Bars

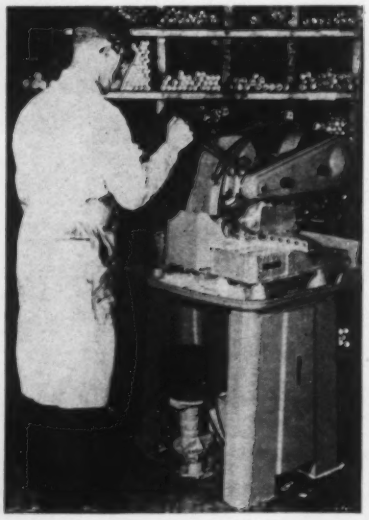
INCREASED power and capacity, a hollow arbor mist coolant, and a retractable size gage are features of a 12 in. cutoff machine. The unit handles 1½ in. diameter solid bar steel on a production basis. Other production capacities: 2 x 8 in. wood and plastic, 3¼ in. diameter ferrous and nonferrous tubing and solid round bars. It cuts 3 x 3 in. angles and 4 in. channels. The company says it will cut all bar stock and angles usually used in plant maintenance.



REDESIGNED STRUCTURAL MILL REMOVES STOCK FASTER and positions the working head more rapidly. New design features incorporate ball screw lead screws, nonmetallic precision ground ways, hydraulic counterbalance of the working head, electronic overload protection, hydraulic binders, centralized automatic pressure lubrication, and welded steel construction. The mill has a horizontal travel of 120 in. with a vertical travel of 60 in. The 40 hp direct drive spindle motor affords 10 in. of infeed. Either 4½ or 5 in. diameter cutters with carbide inserts will feed 30 in. per minute with a 1½ hp motor (or 60 in. per minute with a 3 hp motor). For further information, **write** Kling Div., Hill Acme Co., 1201 W. 65th St., Cleveland 2, Ohio

The machine (it has an abrasive wheel) can cut to a tolerance of less than 0.005 in. The company says this accuracy is achieved by a combination of high power (5 hp), high surface speed (more than 12,500 fpm), and use of the retractable size gage.

The gage compensates for heat expansion created during abrasive cutting of ferrous pieces. The machine accommodates NEMA 213 and 215 frame motors. The unit is a swinging arbor type and requires only a minimum clearance from walls, posts, and other machines when handling long pieces, and even when making miter cuts. Safety features include a wheel guard that lifts to permit front loading of long pieces.

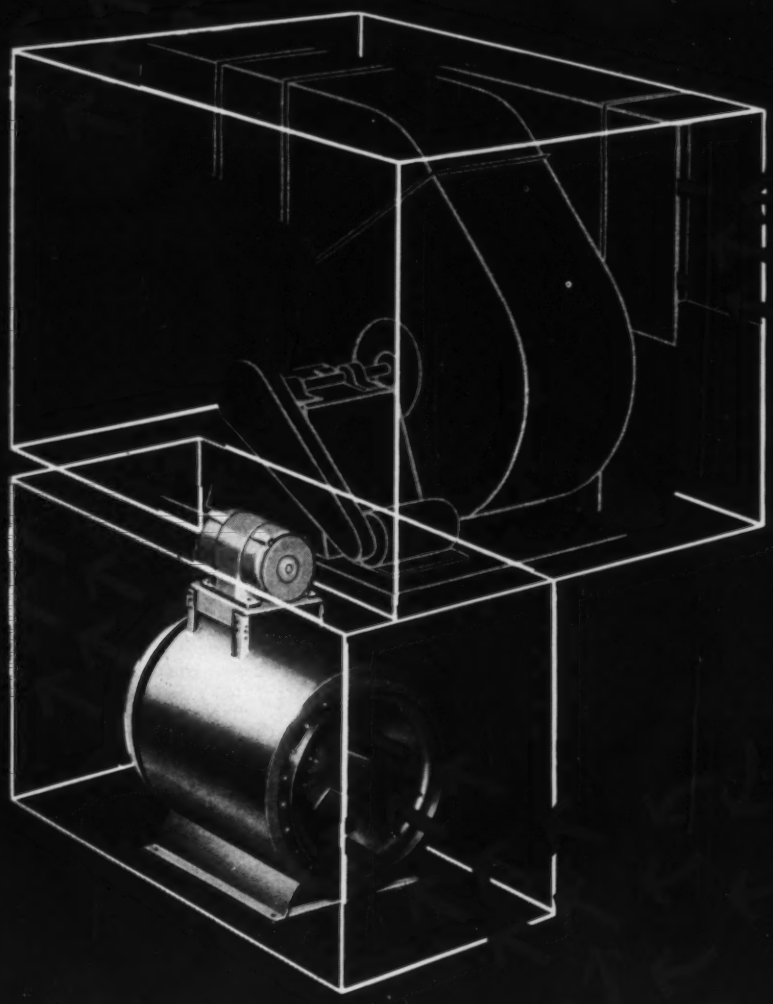


For further information, *write* Delta Power Tool Div., Rockwell Mfg. Co., 486 N. Lexington Ave., Pittsburgh 8, Pa.

Static Powered Drives Available up to 200 hp

SILICON DIODES and saturable reactors rectify current from ac to controllable dc on the V*S Statatron. The static powered unit is suitable for a wide range of variable speed applications from 1 to 200 hp.

The equipment consists of three basic components: The Super "T"



Save space with the new in-line CENTRILINE fan!

Now from Westinghouse, a totally new type of fan...the in-line, Airfoil, centrifugal CENTRILINE® . . . gives you the Airfoil centrifugal fan performance of conventional fans in less than half the installed space.

The in-line air flow of CENTRILINE lets you save space by using in-line duct-work. Inlet and outlet dimensions are identical. You can hang CENTRILINE fans from ceilings, stack them, mount them on walls, as well as on floors and platforms.

Space saving? By using 49 of these compact fans, the Travelers Insurance Companies of Hartford were able to design the air conditioning system for their huge home offices without stealing valuable office space...using only their existing equipment rooms.

CENTRILINE fans also insure quiet operation. Secret is a Westinghouse exclusive: the Airfoil-bladed centrifugal wheel. Save space, cut installation costs and reduce noise with CENTRILINE, for both commercial and industrial installations. Ask your consulting engineer. Mail coupon for detailed catalog. J-80715

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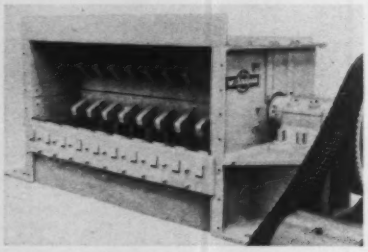
dc motor, the operator's station, and the Statatron control cabinet. Dynamic braking provides fast, smooth, slowdowns and stops.

For further information, *write* Reliance Electric & Engineering Co., 24701 Euclid Ave., Cleveland 17, Ohio.

Machine Crushes Sinter

INTEGRAL, 9 in., hard surfaced teeth are employed in a breaker to crush material coming from a sintering machine against special alloy grizzly bars. The unit was developed for heavy duty, continuous service with extremely abrasive, high temperature materials.

The McLanahan sinter breaker is assembled in two standard widths —72 and 94 in., each with a roll diameter of 24 in. Water cooling is available for the crushing roll



and rollshaft bearings. The breaker crushes any volume of material to be discharged to it by the sintering machines.

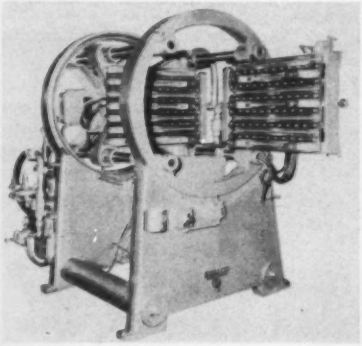
Drive components: A quadruple width chain, 80 tooth driven sprocket, and a 16 tooth drive sprocket. Breaker roll speed of 20 rpm is attained through a horizontal motor reducer.

For further information, *write* McLanahan & Stone Corp., Hollidaysburg, Pa.

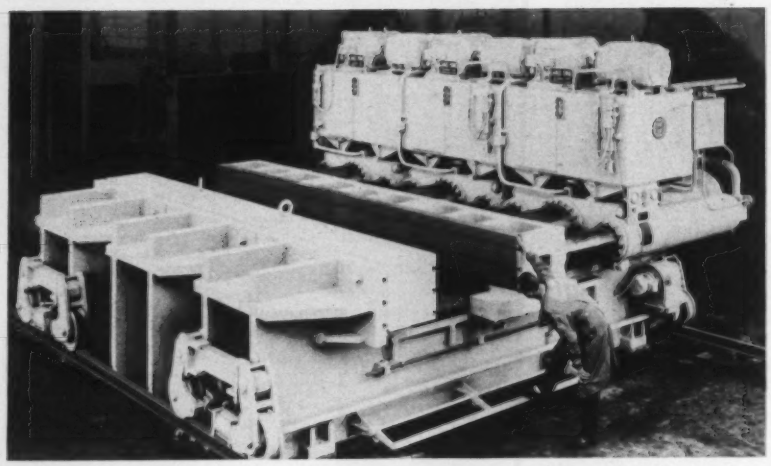
Shell Core Blower Has Automatic Rollover

THE SEMIAUTOMATIC Shalco shell core blower (Model U-180-M) has many automatic features, including power rollover. Only a few manual operations (such as corebox opening and closing) are required in a cycle. Each step in sequence is automatically controlled by preset timers to insure consistent quality of shell core production.

Shalco says the compact unit has all the basic features and versatility of its fully automatic counterpart, the Model U-180, but at considerably less cost. It takes up an area of only 8 x 8 ft, and is available for gas or electric corebox heating. It accommodates coreboxes up to 20 x 27 in. with a maximum depth of 15 in. The integral sand hopper will hold 150 lb. One man can operate more than one machine (righthand and lefthand models are available). Auxiliary attachments common to the automatic Model U-180 (such as automatic sand feed, internal gas hot air cure, top and side draw attachments, and mechanical ejection) are also available.



For further information, *write* Shalco Div., National Acme Co., 170 E. 131st St., Cleveland 8, Ohio.



THIS LARGE HORIZONTAL FORMING PRESS will be used by Adams Div., Indianapolis, Le Tourneau-Westinghouse Co., to form frame members, mold boards, and other parts for giant earth moving equipment. The unit has a total ram pressure of 2550 tons and a ram travel of 6 ft. It's composed of three 850 ton presses arranged side by side and provides the advantage of working them together or separately for normal jobs. A track permits outside units to be moved to other locations in the Adams plant. Each unit has a 60 hp motor and starter and each motor drives an Oilgear 44.6 gpm pump. For further information, **write** Lake Erie Machinery Corp., a subsidiary of Bell Intercontinental Corp., 500 Woodward Ave., Buffalo, N. Y.

Motor Insulation System Keeps Out Foreign Matter

PROTECTION against moisture, chemicals, oils, and abrasive contaminants is provided by the Capsular insulation system for encapsulated, random wound, ac induction motors. A heat resistant, plastic resin completely seals end coils and fills spaces between wires in the stator slots with a moistureproof, chemical resistant, protective sheath.

The company says the encapsulating material has high dielectric strength and exceptional thermal endurance. High resiliency allows it to withstand the effect of contaminants drawn into the motor by the ventilating air stream.

The insulation system can be sup-

DoALL's NEW *Dart* SAW BAND...

outcuts other blades!

Banner Welder, Inc.

DESIGNERS AND MANUFACTURERS OF RESISTANCE WELDING EQUIPMENT

6830 North 43rd Street • Milwaukee 9, Wisconsin • Flagstone [redacted] 2-2100

October 24th, 1960

DoALL Wisconsin Company
2725 W Oklahoma
Milwaukee, Wisconsin

Att: Sales Manager
Mr. J Paskell

Gentlemen:

Today we have to get the most out of the tools we use if we are to make a profit. There is not a greater satisfaction to a manufacturer than to purchase such a tool. Time and again a salesman will come in and give me all the advantages on his product, why I should buy and how his product is the best on the market. If I have heard this once I have heard it a thousand times. This is one time I am happy to say thanks to a company who has a product that will perform as they state it will.

I imagine you have received many comments on this new product, however I want to be one to give my personal satisfaction, It is DART BLADE. I cut Ampco, Mild steels and hardened steels. I used a coolant and ran at about 175 FPM. Being a normal person that like to see what a new product will do I did not baby this blade. The results were to 4 to 1 over any other blade that I have used and at nearly the same cost of the other blade.

I wish again to say thanks for keeping me informed and always trying to improve your good products.

Very truly yours,

Always on the alert for better ways, Banner Welder, Inc., Milwaukee, Wisconsin, tried DoALL's new *Dart* Saw Band. The results were startling—and convincing.

Read what Banner has to say. Then try the new *Dart* Saw Band yourself.

Dart, is guaranteed to outperform any other carbon steel saw band or your money back. Call your DoALL Sales-Service Store today.

SB-87

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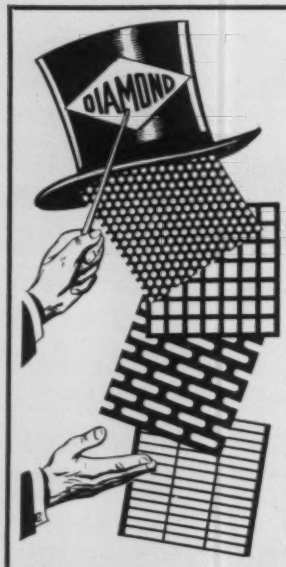
The DoALL Company, Des Plaines, Illinois

Call Your DoALL Sales-Service Store



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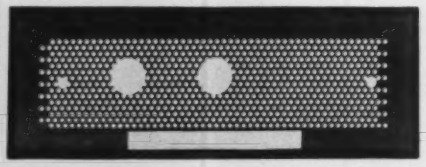
We're not magicians but, in nearly half a century of successful experience, have acquired such a wide range of dies, tools and other plant facilities that almost anything in the way of perforated metal sheets, plates, or parts can be produced efficiently and economically.

Our new 32-page **"Catalog 59"** illustrates a great variety of perforated metal patterns and gives complete working data. Also shows many modern industrial applications. Write for a free copy and let us quote on your requirements. When given sufficient information, our experienced engineers are often able to make money-saving suggestions—without charge or obligation.



Control Panel for Electric Range. We fabricate special panels or parts to any desired extent.

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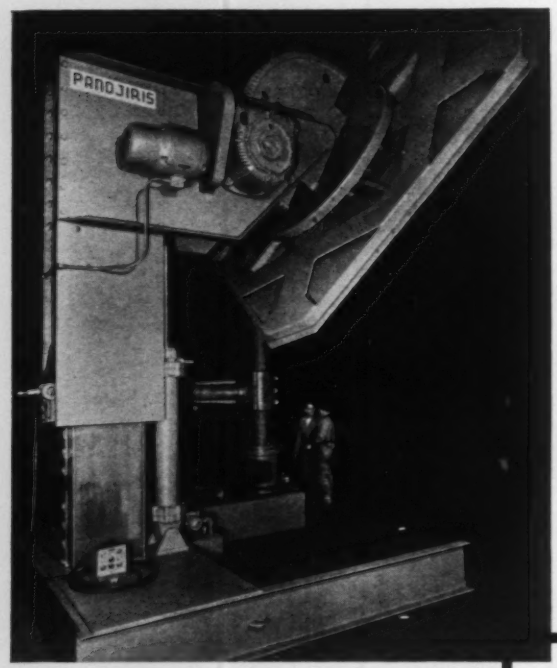


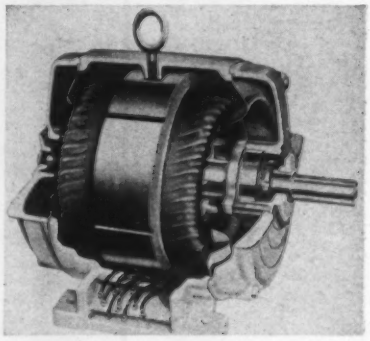
Put 20 tons where you want it

Position of the work is mighty important when welding. This 20-ton capacity positioner tilts, rotates and elevates automatically. Two standard Cone-Drive **double-enveloping worm** gear reducers provide the drive and tuck away compactly under the table.

Compact Cone-Drive gearing is available in gearsets, speed reducers and gearmotors.

CONE-DRIVE GEARS
DIVISION MICHIGAN TOOL CO.
7171 E. McNichols Rd., Detroit 12

NEW PRODUCTS and equipment



plied on open, dripproof motors, 445 U-frame sizes and smaller, 600 volts and below. Special electrical and mechanical features are available.

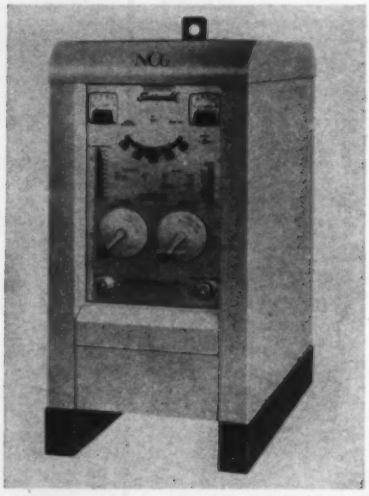
For further information, *write* Dept. P., Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

Welder Works Fast On Light Gage Metal

CONTINUOUS voltage and slope adjustments are featured on a dc welder that is specially adapted to high speed welding on light gage metal.

The unit (Sureweld DRCP-33) provides five voltage steps with continuous selection throughout the entire range and continuous adjustments of the volt-ampere curves. The operator is able to make slope and voltage adjustments during the weld.

It provides currents as low as 25 amperes at 14 volts and can weld

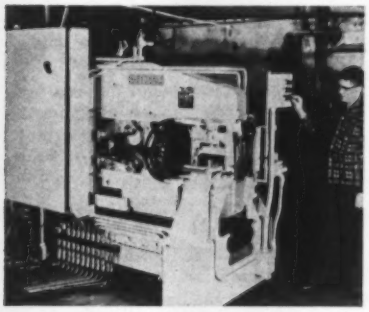


alloys and other metals in the area of 0.030 in. without burnthrough or spatter at relatively high speeds. Rated welding current is 300 amperes at 100 per cent duty cycle. A 115 volt outlet provides input leads to automatic control equipment. Optional equipment is available.

For further information, *write* National Cylinder Gas Div., Chemetron Corp., 840 N. Michigan Ave., Chicago 11, Ill.

Strip Welder Employs Mash Seam Technique

A HIGH speed, high strength joint that can be left in the work is made by an automatic, tube mill, strip welder that shears, welds and planishes on a work cycle of less than 25 seconds. The unit accommodates cold rolled steel stock from 0.040 to 0.060 in. thick and 2 to 7 in. wide.

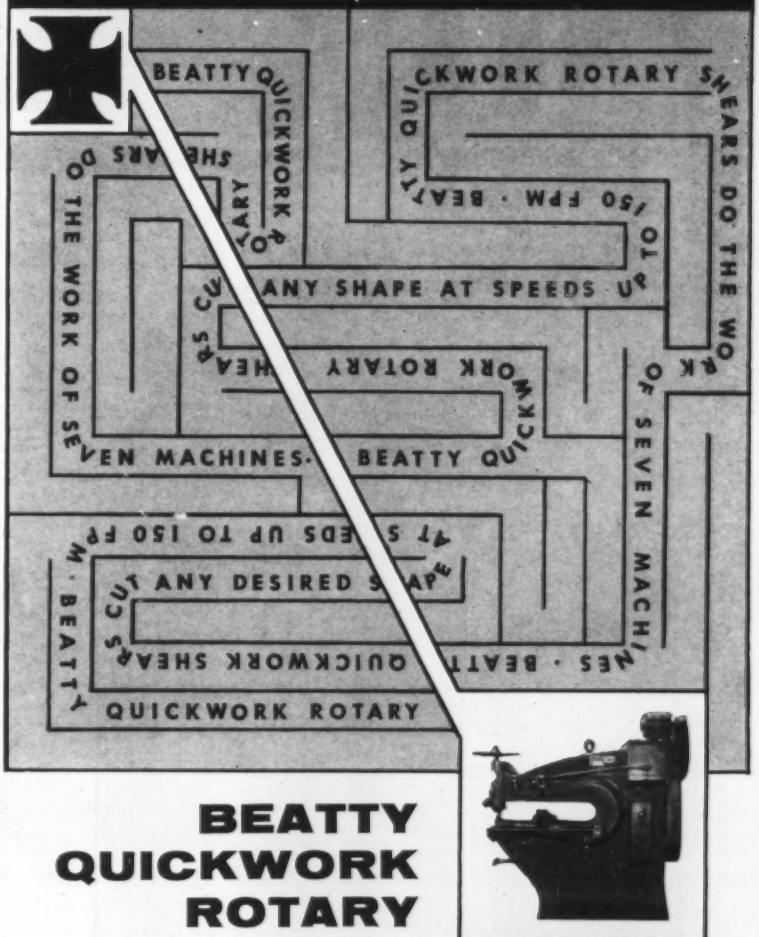


The operator manually locates the trailing and leading edges of the strip. He presses an automatic sequence button to complete the cycle.

Welding power is supplied by a 30 kva transformer mounted on a traveling "C" frame which also houses welding rolls, shears, and the planishing unit. Welding roll rocker arms are connected to the transformer in a close electrical loop to permit use of a transformer with a low rating and a simplified conductor circuit. A 10 hp hydraulic unit delivers 15,000 lb of force to the planishing rolls and is the power source for strip clamping and shearing.

For further information, *write* National Electric Welding Machines Co., 1846 Trumbull St., Bay City, Mich.

SLASHES THROUGH THE MAZE of COMPLICATED SHEARING!


BEATTY QUICKWORK ROTARY SHEARS DO THE WORK OF SEVEN MACHINES
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CUT NARROW STRIPS
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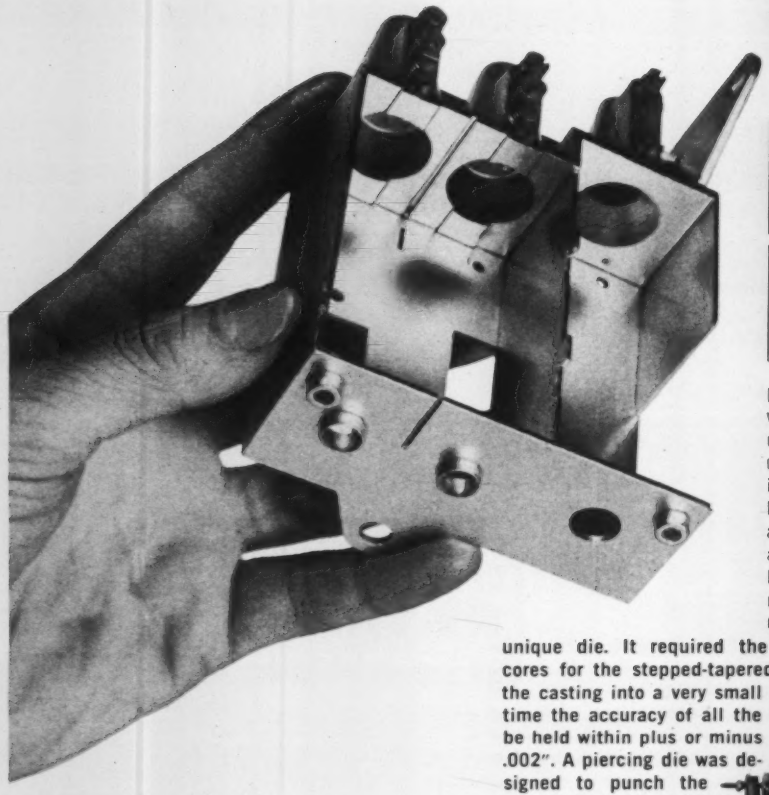
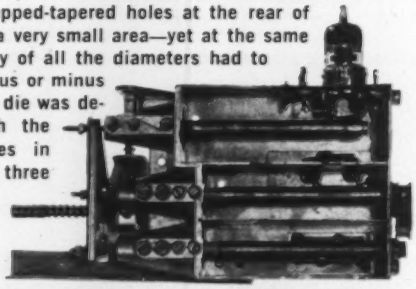


■ Supplying this Motorola television tuner housing on a volume basis could have been a real production headache—were it not for the crackerjack combination of a die caster's skill and Zamak. With the performance virtues of these remarkable zinc die casting alloys in mind, Serv-All Tool and Die Company carefully worked up a unique die. It required the withdrawal of three cores for the stepped-tapered holes at the rear of the casting into a very small area—yet at the same time the accuracy of all the diameters had to be held within plus or minus .002". A piercing die was designed to punch the quarter-inch holes in the housing's three "ears" as well as several undercuts impossible to cast. These holes were also held to plus or minus .002". ■ Serv-All knew Zamak could give them the castability they needed, could meet the demanding tolerances, could provide the high-strength, thin-wall sections required, and had the ductility for an accurate, easy piercing operation after casting. They also knew of the overall production economies inherent to Zamak—low die cost, long die life and high production speeds. One other characteristic of Zamak sealed the choice—the wide variety of finishing procedures which can be used. In this case the housing is copper-plated to facilitate soldering.



MOTOROLA TELEVISION TUNER HOUSING

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The New Jersey Zinc Company's "Zinc Die Casting of The Year" Competition

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NEW literature

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Carbide Tipped Saws and Tools

Specifications and illustrations for 14 different types of blades are given in a handbook-catalog. Featured is a blade selector that helps you identify a righthand and lefthand blade and shows you how to protect carbide tipped tools and blades in production. Victory Carbide Saw & Tool Co., 1027 Anita Ave., Antioch, Ill.

Barrel Finishing Data

A 96 page booklet (Form 501), includes descriptions of the various barrel finishing processes, recommendations of the various abrasive shapes and sizes for applications in which they are best suited, case histories, description of all types of finishing equipment available, discussion on compounds and their effects, and practical suggestions on operating procedures. Advertising Dept., Norton Co., Worcester 6, Mass.

Steam Generator Tube Failures

Factors contributing to tube failures in high pressure steam generators are examined and prevention methods discussed in an eight page booklet. Dow Industrial Service Div., Dow Chemical Co., 20575 Center Ridge Rd., Cleveland 16, Ohio.

Wire Flattening Calculator

A roll pass calculator determines approximate starting round sizes for flat wire sections and the number of passes required. Fenn Mfg. Co., Fenn Road, Newington, Conn.

Heavy Duty Blast Cleaning Barrels

Five, heavy duty, Rotoblast barrels (work capacities range from 15 to 102 cu ft) are described in Bulletin 705. Illustrated case histories show how these barrels have reduced costs substantially at many different installations. Pangborn Corp., Hagerstown, Md.

Inspection Manual

"Inspection Manual for Hot Dip Galvanized Products," 24 pages, describes significant factors governing inspection, properties, specification, and purchasing, of hot dip zinc coatings. American Zinc Institute Inc., 292 Madison Ave., New York 17, N. Y., or American Hot Dip Galvanizers Association Inc., 5225 Manning Place N.W., Washington 16, D. C.

Valve Tap Bulletin

Bulletin G-102 describes stationary and rotary valve taps, and includes specifications and pertinent information. Landis Machine Co., Waynesboro, Pa.

Welding Alloy Wall Chart

A wall chart is offered on a complete line of welding, brazing, and soldering alloys and fluxes for joining all commercial metals. All-State Welding Alloys Co. Inc., White Plains, N. Y.

GENERAL ELECTRIC does. To produce thousands of these precise "dog pointers" on a lower cost basis they redesigned for powder metallurgy. Instead of a two-part item—which had to be machined, punch pressed, deburred, re-machined and press fit together—one punch of the compacting press at Dixon Sintaloy, Inc. does the job. Each one of the dog pointers pressed from brass powder meets tolerances of ± .001" on the diameter of the .061" hole and has the smooth, dense properties essential for plating. This is accomplished readily by GE to insure that the dog pointer matches the extra-long service life of the kilowatt-hour and other electric meters it is used in.

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Metals Outlook Brightens

DEMAND for steel, aluminum, and other metals is on the threshold of a buildup.

Users, who for months have been living off their inventories rather than placing new orders, are now increasingly emphasizing they want immediate delivery when they place orders. That indicates users have their inventories down to a bare minimum.

Resumption of buying for current consumption could put enough of a load on mills that they would be unable to give as prompt deliveries as they do today. The stretchout would influence buyers to add to their inventories of materials. Thus, there could be a snowballing of orders to mills. Even a modest increase in demand at the user level would have a big impact on the mills.

Turnarounds in steel demand can be quick. History shows this.

Already contributing seasonally to a strengthening in steel demand is the construction industry.

Contractors and structural fabricators are ordering bigger tonnages of plates, shapes, reinforcing bars, pipe, and wire mesh as they resume work on projects that were halted during the winter. Thanks to the upturn in demand for construction material, steelmakers with broad product diversification are more than offsetting losses in flat rolled products due to automotive curtailments.

As the weather moderates, building activity will shift into high gear—sparked by government spending. The Kennedy administration is urging state and local governments to expedite all projects that will provide immediate jobs. More than $1 billion of federal aid, originally slated for release in the second quarter, is already being funneled into school, hospital, and highway construction.

The impact on steel will be considerable because construction is a top steel market.

FABRICATORS HOPEFUL— Confirming the brighter outlook, the American Institute of Steel Construction reports that January bookings of structural fabricators were 22 per cent higher than December's and 23 per cent above those of January, 1960. James M. Straub, president, calls the higher bookings "encouraging" because they come from almost all sections of the country and reflect "numerous small and medium sized contracts, rather than two or three huge projects."

AUTO UPTURN AHEAD?— Recent cutbacks in orders from automakers reflected their efforts to reduce steel inventories that piled up after production schedules were trimmed. Now that corrections have been made, any decision to step up production will be translated quickly into new orders. Last month, the auto industry turned out about the same volume of cars as its dealers sold (360,000). This month, it's expected to produce about 400,000 cars. The outlook for April is uncertain. If Ford Motor Co. and GM's Fisher Body Div. stick to their tentative buying plans, they'll take 30 to 40 per cent more steel in April than they'll get from the mills in March.

PRODUCTION STEADY— Look for ingot production in the week ending Mar. 18 to equal the 1,580,000 tons that STEEL estimates the industry poured in the week ended Mar. 11. Output then was unchanged from the previous week's total. Market analysts expect operations to average about 56 per cent of estimated 1961 capacity this month, 60 per cent in April, and 65 per cent in May. The projected uptrend is hardly more than seasonal, but it could rise faster and reach a higher peak if new car sales start booming.

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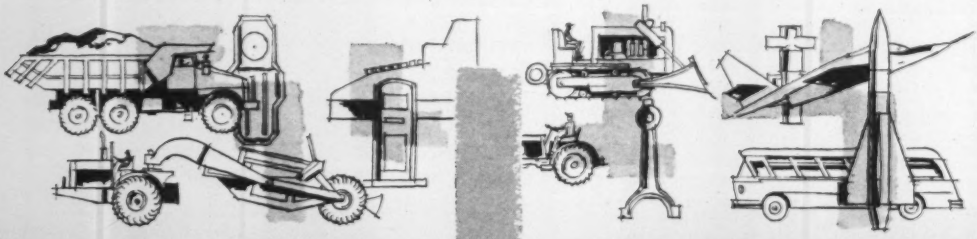

in forgings

Sizes: 1 ounce to 500 pounds

Materials: Carbon and Alloy Steel, Non Ferrous and Stainless, Titanium, Pure Molybdenum, and High Temperature Alloys (Plain or Heat Treated)

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in stampings

Sizes: 3 inches by 3 inches, to 60 inches long, 40 inches wide and 16 inches in drawn depth.

Materials: Steel, Stainless and Aluminum. (Blanking, forming, welding, sub and final assemblies).

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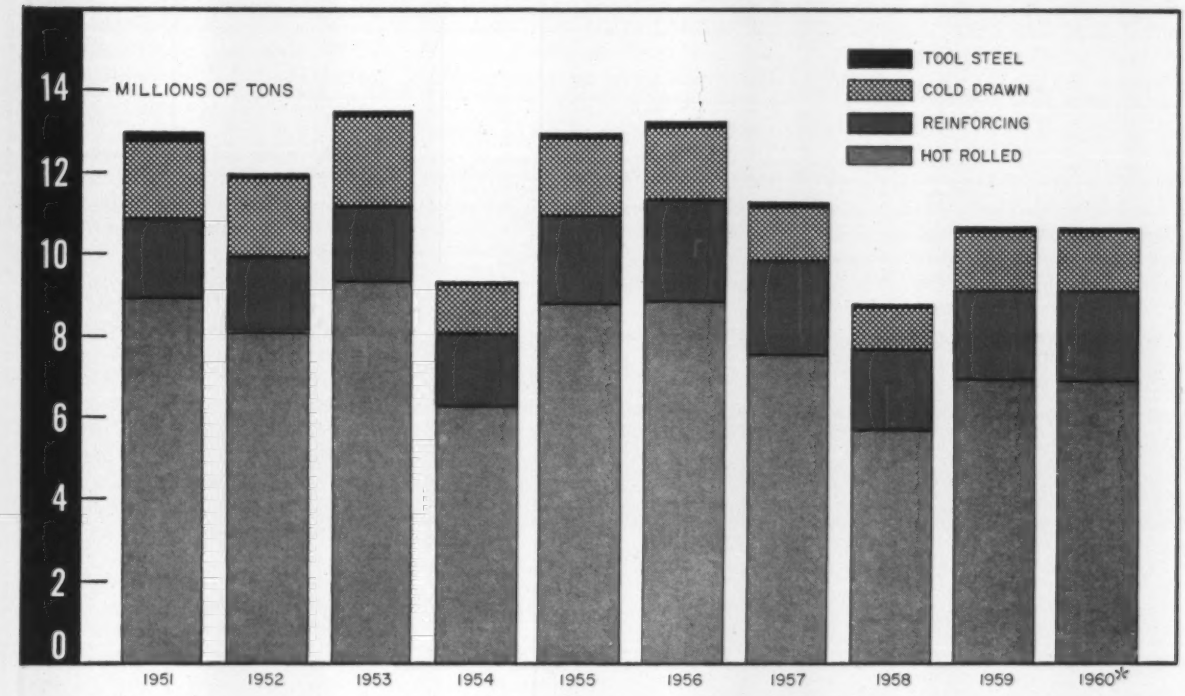
FORGINGS AND DEEP DRAWN STAMPINGS

Steel Bar Shipments 1951-60 (Carbon, Alloy, Stainless)



*Estimated by STEEL.

Broader Bar Demand Seen by Midyear

WHAT'S going to happen in the steel bar market this year? Following the slight contraction (measured by mill shipments) registered during 1960, barmakers have looked over the 1961 prospects and come up with the conclusion that there's little hope of a broad demand developing before midyear.

Here are brief summaries of 1961 prospects in the four major bar marketing categories searched for clues to the demand trend:

• Automotive — Forecasts of 1961 passenger car production range between 5.5 million and 6.5 million units; truck production around 1 million. The bottom of the passenger car estimate seems more realistic at present, but it's hoped a spring buying surge will cut deeply into the large stocks of cars held by dealers and give production a good nudge.

• Service Centers—Steel is moving a little faster through the warehouses, but a broad buying pickup hasn't started.

Distributors report that they are comfortably stocked. They aren't likely to do much buying of bars until a business uptrend is more clearly discernible.

• Construction—Government pump priming of the economy may spur building over the nation. At the start of 1961, new construction was expected to reach $57 billion for the year—up more than 3 per cent from 1960's $55 billion. It could go higher.

• Machinery—The long term outlook for capital equipment buying is enhanced by President Kennedy's support of depreciation tax reform. Nonelectrical machinery manufacturers expect to sell $29 billion worth of equipment this year, about 5 per cent less than in 1960. Electrical machinery and equipment sales may equal the $25 billion total

Steel Bar Consuming Markets

(Net tons; all grades)

Markets	Tonnage	% of Total
Automotive	1,836,204	21.74
Warehouse	1,642,984	19.45
Construction	1,254,682	14.85
Machinery	874,342	10.35
Nonclassified	796,415	9.42
Fasteners	349,752	4.14
Forgings	307,602	3.64
Agricultural	271,549	3.21
Railroads	207,171	2.45
Converting	181,941	2.16
Contractors' Prds.	159,371	1.89
Elec. Machinery	110,044	1.31
Mining, etc.	107,863	1.28
All other	347,517	4.11
Totals	8,447,437	100.00

Note: Based on data for first nine months of 1960.

reported for last year.

• **Moderate Pickup in March?**—Demand has shown little improvement since December, when sales skidded from a November peak. Volume in January equaled December's, and that in February just about kept pace with January's. Some automotive orders originally scheduled for February shipment were deferred until March, but barmakers say pushbacks aren't the big factor in the market situation—the chief problem is getting in orders for any delivery. Producers are hoping for a March pickup.

• **Inventories Down** — While sluggish demand is expected throughout the first six months this year, buying will be better in the second quarter than in the first three months. Reason: Users' inventories have been liquidated to the point they'll have to begin buying steel just to support their curtailed manufacturing schedules.

• **Last Year Below Forecast**—Record shipments had been predicted for 1960. But the total (10,602,050 tons) fell short of expectations, and was third smallest of the last decade. The annual record, 13,482,707 tons, was set in 1953. In strike-ridden 1959, the mills moved 10,614,633 tons.

• **Reinforcing Gains**—Declines from 1959 were reported in all categories of bars except reinforcing, which registered a small increase. The breakdown: Hot rolled (carbon-alloy-stainless), 6,915,435 tons vs 6,936,291 in 1959; cold finished (carbon-alloy-stainless), 1,385,333 vs. 1,408,811; tool steel, 86,784 vs. 96,069; reinforcing, 2,214,498 vs. 2,173,462.

Accounting for 14 to 17 per cent of total steel shipments annually over the last decade, bars enter into more diversified manufacturing than any other major steel product. The bulk of the tonnage (about 68 per cent) is disposed of in the automotive, service center, construction, and machinery categories. The biggest outlet is the automotive industry, which last year took more than 21 per cent of the total tonnage (see table).

• **Stiff Competition** — While 1960 bar imports were down around 40 per cent from the preceding year, foreign competition continues severe, particularly in the reinforcing category. Imports in the first 11 months of 1960 were 588,319 tons valued at $61,343,462 vs. 997,526 tons valued at $84,465,979, in the corresponding 1959 period. The 1960 intake broke down: Reinforcing bars, 461,974 tons vs. 806,306 in 1959; carbon bars, 119,461 vs. 187,322; alloy bars, 5211 vs. 2375; hollow bars, 1673 vs. 1513.

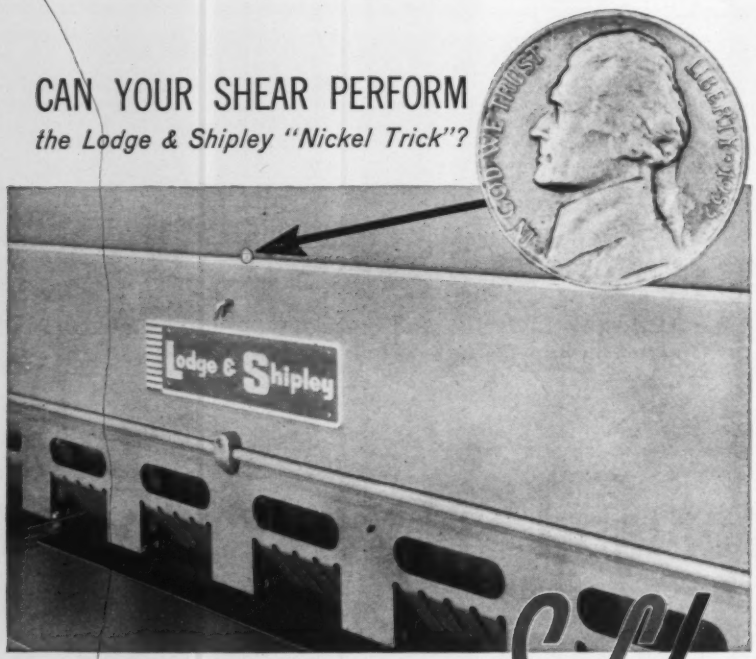
Exports increased in the period, totaling 79,869 tons valued at $18,532,633 against 61,449 tons valued at $13,449,276 in the like period of the preceding year. Slight increases were scored in all categories. Exports broke down: Hot rolled, 41,186 tons; alloy hot rolled, 10,625; reinforcing, 15,458; tool steel, 1199.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 168

With spring approaching, the outlook for the construction steel products is brightening. Reinforcing

CAN YOUR SHEAR PERFORM
the Lodge & Shipley "Nickel Trick"?



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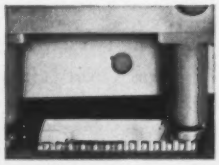
... unequaled holding power, but ... NO IMPACT ... NO MAR ... NO NOISE ... with exclusive ...

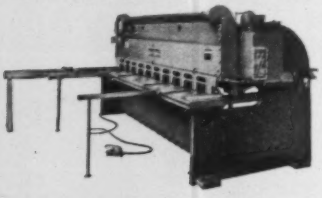
So vibration-free a nickel balances easily right above air-hydraulic holddowns applying tons of pressure, that's the Lodge & Shipley Shear feature demonstrated by the "nickel trick". Sof-Loc Holddown gives positive holding power without damage to the most easily marred material.

Available in capacities from 10 gauge to ⅜ inch, Lodge & Shipley Shears are built for heavy duty and high production shearing with almost a score of features vital to economical operation. Almost all of these features are included in the low base price whereas they're "extras" on comparable machines. The many advantages of Lodge & Shipley Shears are described in a new 20-page catalog. Request Bulletin S-347 from The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.

HYDRAULIC HOLDDOWN SYSTEM



Adjustable for pressure and speed, Sof-Loc Holddowns eliminate impact and damage.



for shear excellence, choose . . .

Lodge & Shipley

*PATENTED, TRADEMARK REGISTERED

bar fabricators are in receipt of a little more inquiry, which is expected to be translated into new orders shortly.

Considerable public work is before the market, including highways and school buildings. Large pending awards include 20,000 tons of bars for a missile project in Montana. Also, 3740 tons of bars will be required for the Yellowtail Dam, Montana, on which bids close Apr. 11.

Midwestern Mills Booking At Slightly Better Rate

Midwestern steelmakers report orders are improving a little. With shipments to autobuilders holding relatively steady, mills are experiencing a modest improvement in buying by miscellaneous consumers, offsetting the downdrift in new auto tonnage.

Most of the business stems from seasonal influences rather than a pronounced boom in manufactured products. Orders seem to be on a higher daily basis than they were in February, but since February was a short month, the total tonnage for March may show little gain. Generally, steelmen don't expect a strong pickup until the second quarter, when possibly automotive tonnage may develop in better volume.

Consumers in the Midwest have reduced their inventories to the lowest point practical, and it's felt that they must now purchase steel to support current operations. With mill shipments available for prompt delivery, they are not under pressure to build up inventories.

Tubular Goods . . .

Tubular Goods Prices, Page 173

With the approach of spring, demand for pipe and tubular products is picking up as contractors prepare for an active construction season. Buttweld pipe is moving at a faster rate, but a good part of current production is being stockpiled in anticipation of stronger demand when the construction season gets underway.

United Concrete Pipe Co., Auburn, Wash., has the subcontract for fabricating 6 miles of 20 and 24 in. concrete cylinder, water supply line for Port Angeles, Wash., involving 520 tons of plates. More than 500 tons of plates will be required for a 200,000 barrel tank which Kenai Pipeline Co. plans in an expansion of its tank farm at the Nikiski (Alaska) marine terminal.

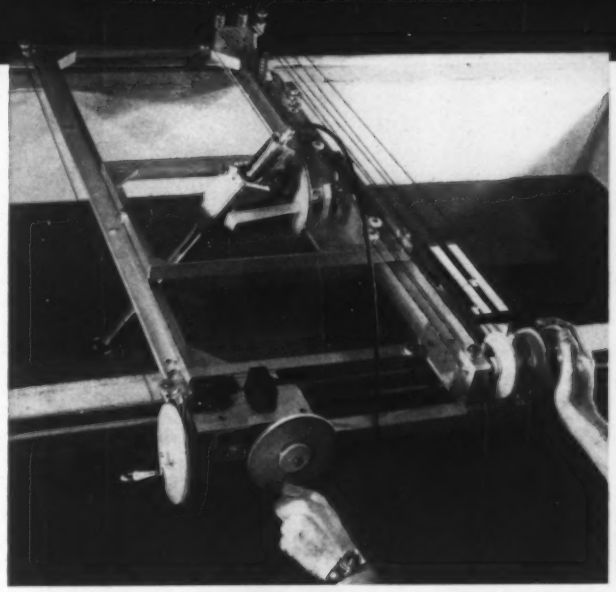
The number of rotary rigs in operation in the U. S. and Canada decreased by 34 in the latest weekly survey of the Hughes Tool Co. The U. S. had 1529 rigs in operation, down 24; Canada had 188, down nine.

Like sheets, the mechanical tubing business is suffering from lack of automotive demand. February orders from nonautomotive accounts were the largest that some tubemakers have had in months. But because orders from the carmakers fell off, total bookings for February weren't any larger than January's. This month's shipments to automotive accounts will be less than last month's.

Aside from weakness in automotive demand, the outlook for mechanical tubing is fairly bright. Or-

SCANNING BRIDGE

The Robot hands for ultrasonic flaw detection!



This "tailor-made" scanning bridge is used with the SONORAY® flaw detector. It holds the transducer in the required position and also permits its adjustment. The transducer may be raised or lowered, tilted in 2 planes or moved to any position in the tank.

Salient features:

- Ease of Operation (all controls are on one side and close to the operator)
- High-Accuracy Positioning • Light in Weight, but sturdy • Economy Priced

The scanning bridge is merely one of many outstanding examples of BRANSON ingenuity. This bridge was designed with the customer in mind! It was well-engineered at the lowest possible cost. The next time you have a problem, call BRANSON and see how fast BRANSON will find the best solution in the shortest possible time.

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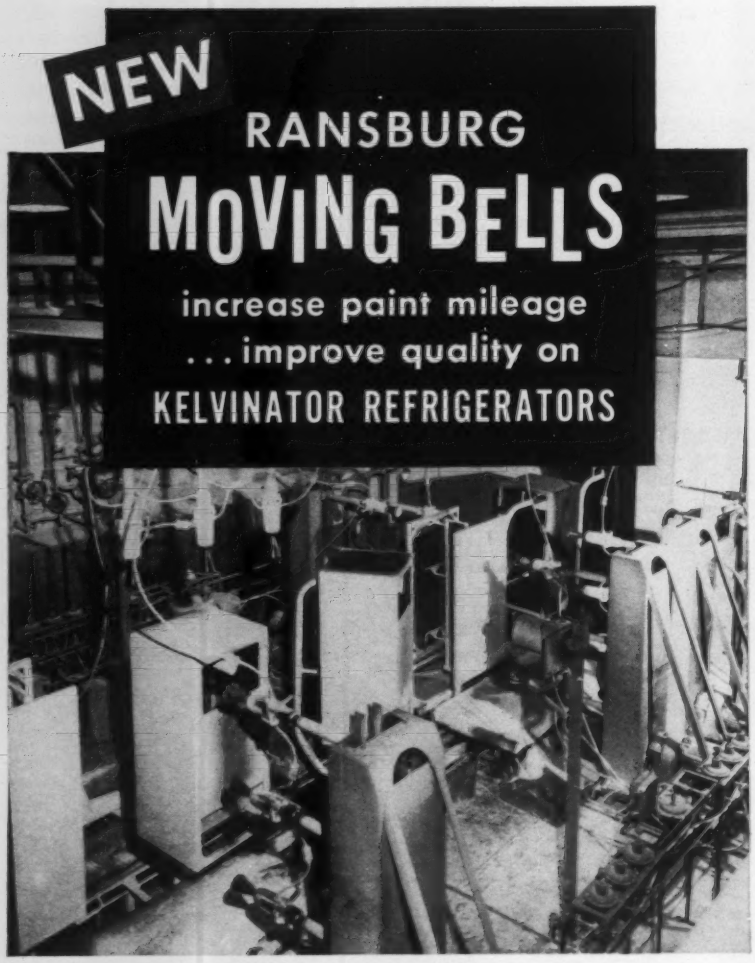


Ransburg's No. 2 Process moving bells—latest innovation in electrostatic painting—automatically paint mixed sizes of refrigerator cabinets and doors on Kelvinator's new finishing line.

On this job—first of its kind—limit switches re-position the reciprocating bells to accommodate various model sizes mixed on the same line. And, electric eyes selectively trigger the paint on and off between parts.

RESULTS? Automatic electrostatic spray painting—which replaced a battery of reciprocating automatic air guns—is providing Kelvinator with a beautiful, higher quality, and more uniform finish. Rejects, formerly a troublesome problem, have been practically eliminated. And, along with appreciable labor savings in this highly automated set-up, paint mileage is substantially improved . . . even bettering the savings indicated in pre-installation lab tests at Ransburg.

Like Kelvinator, other manufacturers of quality products will find Ransburg's moving bells the automation answer for production lines where batching of similar parts is impractical.

NO REASON WHY YOU CAN'T DO IT, TOO!

Want to know how Ransburg No. 2 Process can improve the quality of YOUR painted products—and at the same time—cut YOUR paint and labor costs? Write for our No. 2 Process brochure. Or, if your production doesn't justify automatic painting, let us tell you about the No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized, or non-conveyorized painting.

RANSBURG

RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

ders from construction equipment makers are picking up as roadbuilding accelerates.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 168 & 169

Despite lagging automotive requirements, demand for sheet steel is edging upward. More tonnage is going into light fuel oil tanks, box strapping, and electrical tubing. Manufacturers of shipping drums are buying a shade more actively, and a little more tonnage is going to the distributors.

Requirements of office furniture and shelving makers are less active, but demand in this area is being partially sustained by government orders. Household appliance needs are fair but spotty. Sheetmakers expect more appliance tonnage over the next couple of months but are disappointed by present volume. Appliance makers are encouraged by their 1961 prospects, but they are expanding their production schedules cautiously.

On a daily average basis, orders for sheets in the Pittsburgh district were about the same in February as in January, and it looks like the sidewise movement will continue through March. On the other hand, a Midwestern producer, Granite City Steel Co., Granite City, Ill., is reported booked 100 per cent in cold rolled sheets for March and is said to have already booked at least 40 per cent of its April capacity.

Granite City will add flat galvanized sheets to its product line late this year when its second continuous galvanizing line goes into production.

Plates . . .

Plate Prices, Page 167

Platemakers are reporting modest gains in orders for specialties and alloy grades of plates, particularly for the chemical industry and certain classes of defense work. However, deliveries still range four to five weeks, so buyers are not under pressure to order far ahead.

Demand for the carbon grades reflects a slight betterment in construction needs but a continued lag in heavy tank, line pipe, and railroad equipment. An Eastern carbuilder is suspending operations due to lack of business. Shipwork is

not developing as fast as had been anticipated.

National Steel & Shipbuilding Co., San Diego, Calif., has been awarded a $22 million contract to build two ships for the States Line of San Francisco and the Federal Maritime Commission.

Farm Implement Makers Report Improved Outlook

Farm implement manufacturers view the business outlook more optimistically, and they are stepping up their production schedules in anticipation of better buying by the farmers this spring and summer.

In its report for the first quarter (ended Jan. 31), International Harvester Co. states its domestic farm equipment business is somewhat improved over the same period of 1960. The company sought to reduce the level of factory and dealer inventories in 1960—the farm tractor inventory in the U. S. is now 28 per cent below that of a year ago. Production has been increased.

Construction equipment inventories are also in a healthy state. The U. S. inventory of large crawler tractors, in the hands of the company and distributors, is about 50 per cent of what it was a year ago. The company expects that 1961 business will improve as the year advances.

Wire . . .

Wire Prices, Pages 169 & 170

Merchant wire, notably items used in construction, is showing a little more life. Inquiry is noticeably better, though there has not been any appreciable improvement in orders. Lack of automotive demand is retarding sales of manufacturers' wire items. Furniture makers are showing a little more interest in their requirements.

In building and construction items, interest in mesh is reported up a little, though production continues at low ebb. Some of it is going to concrete pipe shops.

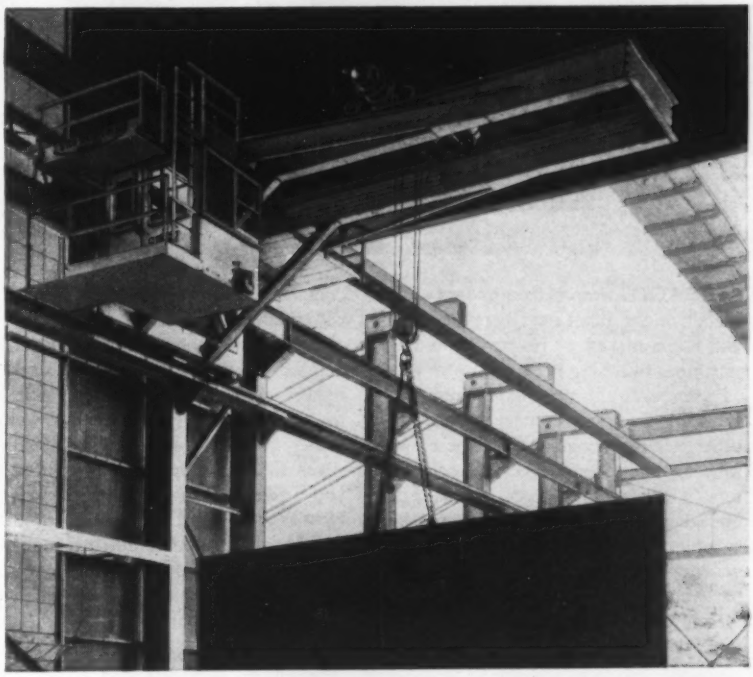
Distributors . . .

Prices, Page 174

A leading distributor in the Philadelphia district has revised price schedules on some products, eliminating item extras and returning to its former order quantity extra plan.

SHEPARD NILES JOB-MATED CRANES:

DIFFERENT—because each job is different



Shepard Niles Cab Operated Wall Crane

This Shepard Niles Job-Mated QUALITY Crane was specifically designed for the actual job it is doing. Each component — motors, controls, frame, gearing, trolleys, brakes — was designed and built by Shepard Niles to give the best overall crane performance under unique operating and load conditions.

Your load-moving problem will receive this same careful consideration at Shepard Niles. Even in so-called "standard" applications, our insistence on selecting the right components to meet exact on-the-job conditions, results in a custom-built crane. Care like this in our plant means lower operating costs and increased efficiency in yours.

For the full story on how Shepard Niles Job-Mated Cranes can cut costs in your plant, arrange to have a Shepard Niles representative call at your convenience. Or send for our descriptive bulletin.

Member of Electric Overhead Crane Institute

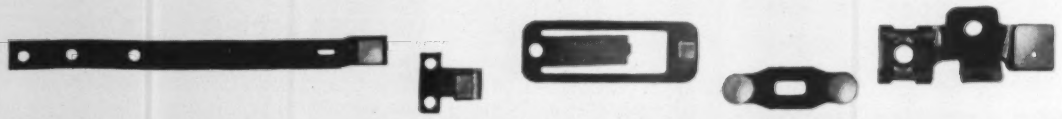
America's Most Complete Line of Cranes and Hoists

SHEPARD NILES
CRANE AND HOIST CORPORATION

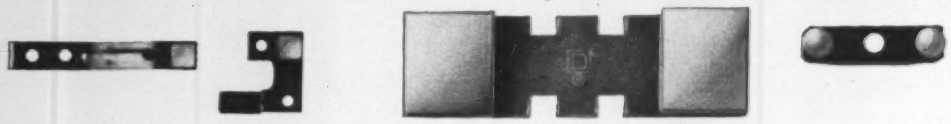
1168 Schuyler Ave., Montour Falls, N.Y.

PRECISION® Quarterly NUMBER 8

PRECISION WELDER AND FLEXOPRESS CORPORATION, 3520 Ibsen, Cincinnati 9, Ohio



Automated Welding Sure Way To Electrical Contact Economies



CHICAGO: Step into a progressive metalworking plant near here and you will find a line of 60 resistance welding machines fastening buttons.

Each month this one plant welds millions of electrical contact buttons to other electrical components. These buttons must be superior electrical conductors (which is why so many are made of fine silver), and above all, they must be reliable. This plant is achieving button-welding reliability of 999,996 perfect parts out of each million welded!

With understandable pride, we note that most of the machines in that reliable line are Magnetic Force welders built by Precision Welder & Flexopress Corp. of Cincinnati, Ohio. Precision is an old hand at reliable button welding.

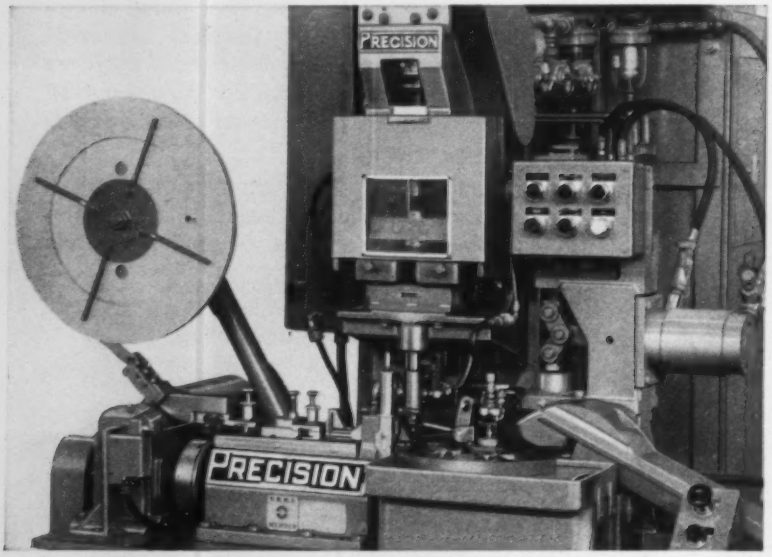
It's a big business, too. Your doorbell, thermostat, dishwasher, drier, toaster, waffle iron, telephone, and automobile would soon break down without reliable contacts. Industrial equipment is loaded with them.

Button welding can be tricky. Besides being difficult to weld directly to other materials, silver is costly. If you decrease the amount of silver and increase weldability by using contacts in which the silver is backed up with other metals, you often end up by increasing costs. However, a good proportion of our country's electrical manufacturing plants find that individual contacts of composite materials make sense for low volume production. Standard resistance welding machines can handle the work—whether welding, brazing, or silver soldering—on a slowpoke basis.

But when it comes to thousands of contacts a month, only welding automation (the kind pioneered by Precision) can really hold costs down. Contacts no longer have to be purchased ready-formed. Automated Precision Welders accept coiled ribbons of pure silver or composite materials, accurately measure and cut off contact blanks, orient them, assemble them to other components, weld the two together automatically, and coin to shape. Ingenious tooling can equip the same Precision machines to handle components of many different sizes and shapes.

In addition, Precision furnishes the electrical industry with Magnetic Force welders with hopper, magazine, dial, and in-line feeds for handling ready-formed contact buttons. You will also find Precision welders (and Flexopresses, too) doing the unusual and difficult jobs in automobile, appliance, communications, aircraft and many other metalworking categories.

If yours is a high-production welding task, or if it involves the welding of precious metals, dissimilar materials, large areas, or other out-of-the-ordinary situations, you ought to look into Precision. Especially if it's profits you're after. And who isn't?



Call these PRECISION Representatives

Frank Brandt
Beverly, Mass.
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Correll Engineering Co.
St. Louis, Mo.
OLive 2-0667

Desco, Inc.
Cleveland, Ohio
POtomac 1-3688

Douglas Engineering Co.
Indianapolis, Ind.
CLifford 1-3647

Greer Equipment Co., Inc.
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HOward 9-4822

Lowe Welding Sales
Des Moines, Iowa
ATlantic 8-5655

Machinery & Welder Corp.
Milwaukee, Wisc.
MItchell 5-1790

Mid-South Equip. Co., Inc.
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CEdar 7-8560

Fred Merchant
Philadelphia, Pa.
TUrner 4-7035

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CRestview 8-4741

G. E. Schmidt, Inc.
Cincinnati, Ohio
MElrose 1-6166

Victor Equipment Co.
Los Angeles, Calif.
LU 5-1286

Weber Welding Supply Co.
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MAyflower 1-5230

Zimmerman & Gaumond Inc.
Chicago, Ill.
TAlcott 3-5191

Zucker Engineering Co.
Detroit, Mich.
TR 5-5300

Precision Welder & Flexopress (Can.) Ltd.
Toronto, Ont. PL 9-1138

The change was made to compensate for a difference in quantity provisions.

The outlook for steel service centers is improving. Recovery is expected to be gradual, with an accompanying extension of delivery schedules.

Purchasing agents representing large users of steel are committed to a policy of conservative buying. Only a radical change in the general industrial activity would change their thinking. Supplies are ample in all categories, multiplying the need for large reserves.

Stocks of Iron Ore Are Up Sharply from Year Ago

Total stocks of iron ore in the U. S. and Canada (from all sources) at the end of January were 73,484,599 gross tons, up sharply from the 58,472,042 tons held at the end of January, 1960, reports the American Iron Ore Association. Of the total, 70,387,183 tons were held in the U. S. against 56,130,633 a year ago. (For a breakdown on the basis of source see table.)

Consumption in January amounted to 6,700,604 tons, off sharply from the 12,420,426 tons reported in January, 1960. Of the total, 6,217,812 tons were consumed in the U. S. (See table for breakdown as to supply source.)

At the end of January, 122 blast furnaces were in operation (112 in the U. S. and 10 in Canada). That compares with 239 a year ago (226 in the U. S. and 13 in Canada).

Pig Iron . . .

Pig Iron Prices, Page 174

Producers of merchant pig iron look for heavier business this month, due largely to the greater number of working days. The daily rate, they say, is likely to show little variation.

Resumption of navigation on the Great Lakes is expected to bring a fairly active westward movement of iron out of Buffalo. It could result in the relighting of blast furnaces serving the merchant iron trade.

Despite active government work, iron production in the Far West is 10 per cent lower than it was a

Iron Ore Statistics—January, 1961

Iron Ore in Inventory—Original Sources, January, 1961

(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
At Furnaces:	L. Superior	Other	L. Superior	Other	Ores	Totals
Start of month	39,805,895	3,367,843	1,957,464	5,179,669	16,804,835	67,115,706
End of Month						
Mass., N. Y.	3,211,163	22,447	95,917	194,441	320,946	3,844,914
Pennsylvania	7,397,916	479,679	29,271	227,879	8,022,653	16,157,398
Md., Va., W. Va.	563,410	1,643	.....	1,928,277	2,893,405	5,386,735
Ky., Tenn., Tex.	282,693	146,274	.....	328,502	119,226	876,695
Alabama	871	1,777,357	.....	126,986	3,678,827	5,584,041
Ohio	9,791,057	24,032	840,104	1,852,098	1,282,139	13,789,430
Indiana	7,554,547	28,011	482,165	6,463	88,642	8,159,828
Illinois	4,530,925	58,004	45,476	.....	246,812	4,881,217
Mich., Minn.	3,162,982	.....	298,312	112,052	413,832	3,987,178
Colo., Utah, Calif.	.....	802,737	.....	.....	25,686	828,423
Undistributed	840	2,445	.....	.....	369	3,654
At end of month	36,496,404	3,342,629	1,791,245	4,776,698	17,092,537	63,499,513
At U. S. Docks	3,486,926	.....	215,495	897,471	2,287,778	6,887,670
Total U. S. stocks	39,983,330	3,342,629	2,006,740	5,674,169	19,380,315	70,387,183
At Canadian Furnaces:						
Start of month	2,694,682	.....	133,116	535,891	95,550	3,459,239
End of month	2,412,363	.....	129,632	459,418	96,003	3,097,416
Total U. S.—Canada	42,395,693	3,342,629	2,136,372	6,133,587	19,476,318	73,484,599

Consumption of Iron Ore—January, 1961

(Gross tons)

	U. S. Ores		Canadian Ores		Foreign	
In U. S.:	L. Superior	Other	L. Superior	Other	Ores	Totals
Mass., N. Y.	248,944	2,190	1,388	15,568	10,297	278,387
Pennsylvania	674,404	166,292	605	51,976	547,082	1,440,359
Md., Va., W. Va.	110,077	18,834	.....	229,920	246,827	605,658
Ky., Tenn., Tex.	45,241	22,295	.....	27,679	7,220	102,435
Alabama	.....	358,639	.....	.....	133,357	491,996
Ohio	743,319	13,383	23,565	105,414	118,712	1,004,393
Indiana	796,736	2,828	65,914	.....	20,385	885,863
Illinois	447,890	2,387	733	.....	31,171	482,181
Mich., Minn.	336,895	.....	74,015	3,864	28,692	443,466
Colo., Utah, Calif.	.....	467,706	.....	.....	15,235	482,941
Undistributed	57	74	.....	.....	2	133
In U. S.:						
Blast furnaces	2,140,058	605,460	64,811	178,077	289,157	3,277,563
Steel furnaces	92,514	38,404	4,866	14,286	265,608	415,678
Sintering	1,170,874	409,961	96,543	241,984	604,215	2,523,577
Miscellaneous	117	803	.....	74	.....	994
Total U. S.	3,403,563	1,054,628	166,220	434,421	1,158,980	6,217,812
Total U. S.-Canada	3,685,882	1,054,628	235,160	554,696	1,170,238	6,700,604

Data from American Iron Ore Association.

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Wallingford, Connecticut

TWX 277

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year ago. Many heavy industries, especially oil tool manufacturers, have left the Los Angeles area.

General Electric Co. will close its Everett, Mass., foundry by the end of this year. Most of the plant's operations will be transferred to the firm's foundry at Schenectady, N. Y. The Everett foundry has operated at a substantial loss during the last three years, officials say.

Republic Steel Corp. shut down a blast furnace at its Thomas Works, Birmingham, to reduce stocks of foundry iron. Officials say it will go back into production "when orders bring the inventory down to a more reasonable level."

Steel Ingot Production Holds at 1,580,000 Tons

Steel production in March will be the highest for any month since last June (about 7 million tons) if the present pace is maintained over the balance of the month. STEEL estimates production for the week ended Mar. 11 at 1,580,000 tons, unchanged from the preceding week's total.

● **Pittsburgh** — Steelmaking here is at the highest level of the year, about 54 per cent of the Jan. 1, 1960, capacity. Operations probably won't climb much higher for a week or two, but seasonal improvements in demand for plates, structurals, galvanized sheets, and tin plate will prevent backsliding.

U. S. Steel Corp. relit an open hearth furnace at its Homestead District Works, Munhall, Pa., raising to ten the number of furnaces producing steel there. The move was U. S. Steel's first publicly disclosed step to boost production in the Pittsburgh district since early January, following the sharp cutbacks for the holidays.

Wheeling Steel Corp. has idled an open hearth at its Steubenville (Ohio) Works. The company is operating eight of its 11 furnaces at that plant.

● **Chicago**—Steel ingot production here is holding unchanged at a rate equivalent to about 63 per cent of 1960 capacity. Small gains in the week ended Mar. 11 were nullified by reductions at others. Mill shipments were slightly higher on the basis of STEEL's estimates.

● **Philadelphia**—STEEL estimates a slight gain in production of ingots for the week ended Mar. 11. It follows an advance of 4 points for the week ended Mar. 4 to an index figure of 88, based on the average weekly production in 1957-59.

● **Cincinnati**—Steel output is rising here, with production estimated by STEEL at 67,074 tons for the week ended Mar. 11—an increase of about 4000 tons over the previous week's total.

● **Los Angeles**—STEEL estimates the steelmaking rate for the Western district at 66 per cent (based on Jan. 1, 1960, capacity) for the week ended Mar. 11. The gain is nearly 5500 tons over the preceding week's output.

● **Youngstown**—Steelmaking operations here are at about 34 per cent of the Jan. 1, 1960, capacity. STEEL's estimate for the week ended Mar. 11 represents a drop of about 3 points from the rate of the preceding week. Republic Steel Corp. took off two furnaces for repairs at its Warren (Ohio) Works. Youngstown Sheet & Tube Co.'s Campbell (Ohio) Works have suspended operations for a changeover of its blooming and hot strip mills.

● **Buffalo**—Steel mills here continue to operate at 36.7 per cent (based on Jan. 1, 1960, capacity). Bethlehem Steel is working 12 of 35 open hearths; Republic Steel, two of nine; and Wickwire Spencer, one of three.

● **Detroit** — Steelmaking operations increased slightly here during the week ended Mar. 11, STEEL estimates. One mill was expected to add an extra turn on its open hearths. Mills report a slight pickup in shipping schedules for late March, but they expect no substantial improvement to develop through April.

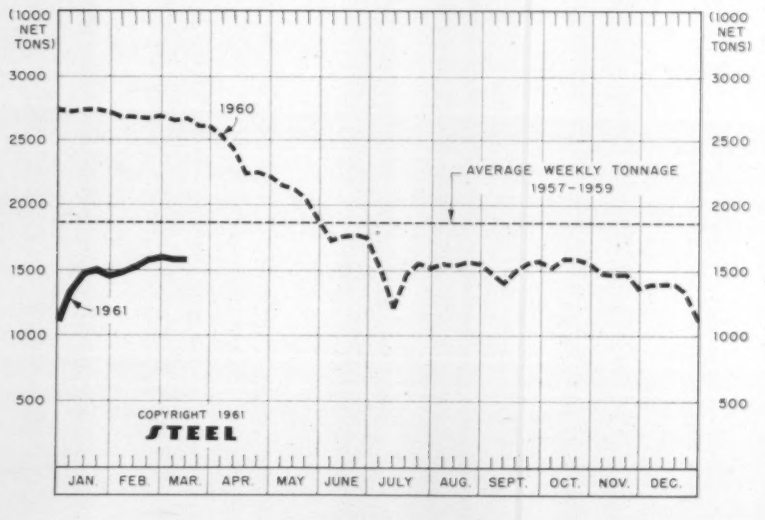
● **Cleveland** — STEEL estimates a continuation of production at about 65,742 tons for the week ended Mar. 11. This is the lowest level recorded so far this year.

STEEL INGOT PRODUCTION

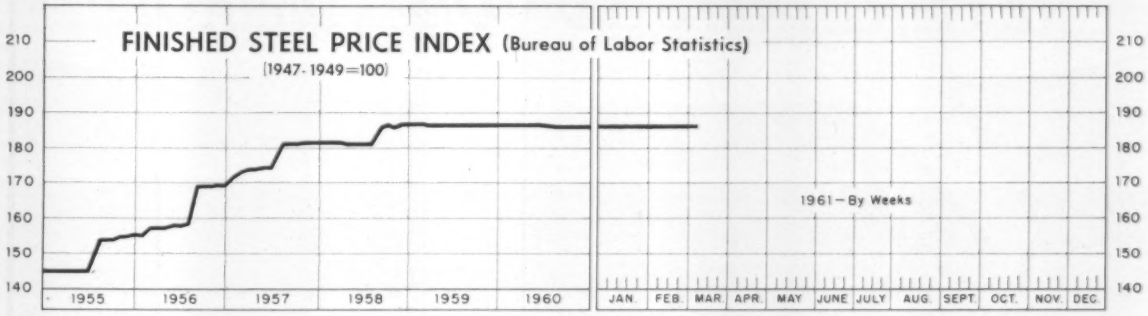
Weeks Ended	Net Tons	Change
Mar. 11	1,580,000*	Unch.
Mar. 4	1,580,000	— 0.1%
Feb. 25	1,582,000	Unch.
Totals to Mar. 4		
1961	13,568,000	—44.1%
1960	24,265,000	

DISTRICTS	Week Ended —Mar. 4— Tons‡	Index†	Week Ended Feb. 25 Index†
Northeastern	235,132	88	84
Buffalo	74,963	77	72
Pittsburgh	318,804	79	75
Youngstown	117,287	69	79
Cleveland	65,742	71	72
Detroit	90,229	86	89
Chicago	344,150	92	93
Cincinnati	63,340	84	90
St. Louis	56,754	108	107
Southern	95,388	88	90
Western	116,913	100	101
Industry	1,580,000	84.8	84.9

*Estimated by STEEL. †1957-59=100.
‡District tonnages are approximate and will not necessarily add to the national total.



Price Indexes and Composites



Mar. 7, 1961	Week Ago	Month Ago	Feb. Index	Year Ago
186.2	186.2	186.2	186.2	186.8

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Mar. 7

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825
Rails, Light, 40 lb	7.292
Tie Plates	6.875
Axles, Railway	10.175
Wheels, Freight Car, 33 in. (per wheel)	62.000
Plates, Carbon	6.350
Structural Shapes	6.167
Bars, Tool Steel, Carbon (lb)	0.560
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895
Bars, H.R., Alloy	10.775
Bars, H.R., Stainless, 303 (lb)	0.543
Bars, H.R., Carbon	6.675
Bars, Reinforcing	6.335
Bars, C.F., Carbon	10.710
Bars, C.F., Alloy	14.125
Bars, C.F., Stainless, 302 (lb)	0.570
Sheets, H.R., Carbon	6.350
Sheets, C.R., Carbon	7.300
Sheets, Galvanized	8.775
Sheets, C.R., Stainless, 302 (lb)	0.658
Sheets, Electrical	12.625
Strip, C.R., Carbon	9.489
Strip, C.R., Stainless, 430 (lb)	0.480
Strip, H.R., Carbon	6.250
Pipe, Black, Buttweld (100 ft)	19.495
Pipe, Galv., Buttweld (100 ft)	23.098
Pipe, Line (100 ft)	195.430
Casing, Oil Well, Carbon (100 ft)	201.080
Casing, Oil Well, Alloy (100 ft)	315.213
Tubes, Boiler (100 ft)	51.200
Tubing, Mechanical, Carbon (100 ft)	27.005
Tubing, Mechanical, Stainless, 304 (100 ft)	194.268
Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
Black Plate, Canmaking Quality (95 lb base box)	7.900
Wire, Drawn, Carbon	10.575
Wire, Drawn, Stainless, 430 (lb)	0.665
Bale Ties (Bundles)	7.647
Nails, Wire, 8d Common	9.433
Wire, Barbed (80-rod spool)	8.372
Woven Wire Fence (20-rod roll)	20.910

STEEL's FINISHED STEEL PRICE INDEX

	Mar. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	209.10
Index in cents per lb	6.713	6.713	6.713	6.713	5.665

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$128.02
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	36.67	35.67	32.67	34.33	48.50

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Mar. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.98	5.98	5.98	5.975	4.90
Bars, C.R., Pittsburgh	7.65	7.65	7.65	7.65	6.25
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.745	5.745	5.745	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.80
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.80
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.25
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.25-6.35
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.60
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin Plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.45
SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	6.40	6.40	6.40	6.40	5.375

PIG IRON, Gross Ton	Mar. 8 1961	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.18	70.18	70.18	70.07	62.16
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.68	70.68	70.68	70.57	62.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	205.00

†74-76% Mn, Duquesne, Pa.

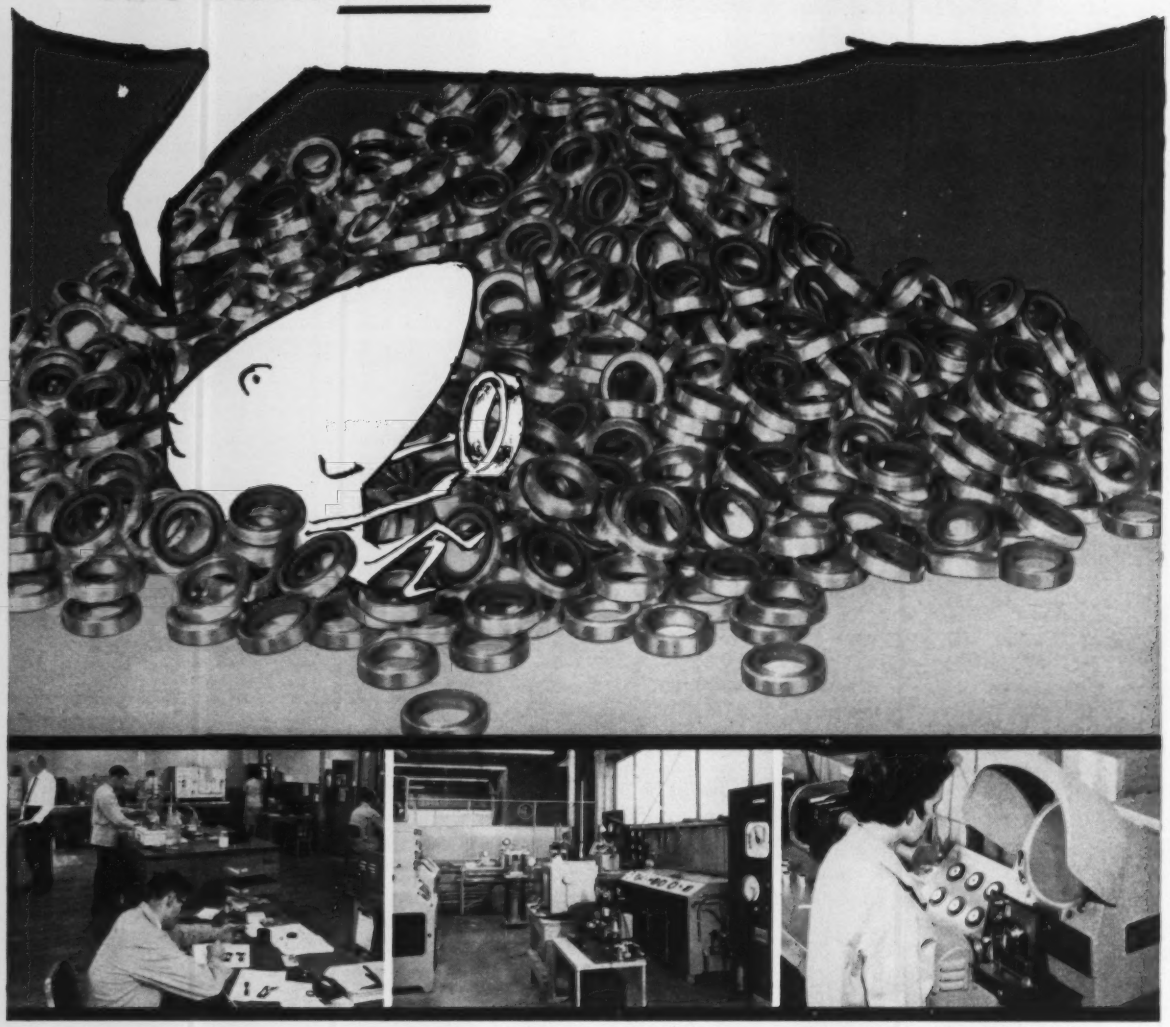
SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$34.50	$34.50	$31.50	$34.50	$48.50
No. 1 Heavy Melt, E. Pa.	39.00	39.00	36.00	36.00	50.00
No. 1 Heavy Melt, Chicago	36.50	33.50	30.50	32.50	47.00
No. 1 Heavy Melt, Valley	36.50	36.50	32.50	36.50	52.50
No. 1 Heavy Melt, Cleve.	33.50	33.50	28.50	33.50	49.50
No. 1 Heavy Melt, Buffalo	29.50	27.50	27.50	31.50	46.50
Rails, Rerolling, Chicago	57.50	56.50	54.50	53.50	65.50
No. 1 Cast, Chicago	42.50	42.50	41.50	45.50	46.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.00	$15.00	$14.125
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.50
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	27.50

YES SIR...THAT'S "CUSTOM" CONTROL!



Control laboratory determines compound best suited to your need.

Engineering Test Laboratory check final design . . establish tolerance limits for production.

"QC." Quality Control technicians are located throughout the plants to examine your parts as they're being made.

It takes more than machines to turn out a consistent, *uniform* batch of oil seals . . . That's why IPC started the highly critical "custom control system."

After engineering and lab analysis a specific recommendation of manufacture is made for *your* oil seal. Critical tolerance levels are established to guide the many Quality Control people who will follow your parts as they move through our plants. At any time, our QC department can halt production if they find variances in manufacture.

Result? . . . *Uniformity* . . the assurance that IPC is controlling quality for you.

We would be happy to show you this model system at work.

IPC

OIL SEALS
PACKINGS
PRECISION MOLDING / *Custom designed for your application*

INTERNATIONAL PACKINGS CORPORATION

© IPC

Bristol, New Hampshire P1

Steel Prices

Mill prices as reported to STEEL, Mar. 8, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 168; footnotes, page 170.

SEMIFINISHED

INGOTS, Carbon Forging (NT)

Munhall, Pa. U5 ....$76.00

INGOT, Alloy (NT)

Detroit S41 .....$82.00
Economy, Pa. B14 ....82.00
Farrell, Pa. S3 .....82.00
Lowellville, O. S3 ....82.00
Midland, Pa. C18 ....82.00
Munhall, Pa. U5 .....82.00
Sharon, Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS Carbon Rerolling (NT)

Bartonville, Ill. K4 ....$82.00
Bessemer, Pa. U5 .....80.00
Buffalo R2 .....80.00
Clairton, Pa. U5 .....80.00
Ensley, Ala. T2 .....80.00
Fairfield, Ala. T2 .....80.00
Fontana, Calif. K1 ....90.50
Gary, Ind. U5 .....80.00
Johnstown, Pa. B2 ....80.00
Lackawanna, N.Y. B2 ..80.00
Munhall, Pa. U5 .....80.00
Owensboro, Ky. G8 ....80.00
S. Chicago, Ill. R2, U5 ..80.00
S. Duquesne, Pa. U5 ....80.00
Sterling, Ill. N15 .....80.00
Youngstown R2 .....80.00

Carbon, Forging (NT)

Bessemer, Pa. U5 ....$99.50
Buffalo R2 .....99.50
Canton, O. R2 .....102.00
Clairton, Pa. U5 .....99.50
Conshohocken, Pa. A3 .104.50
Ensley, Ala. T2 .....99.50
Fairfield, Ala. T2 .....99.50
Farrell, Pa. S3 .....99.50
Fontana, Calif. K1 ...109.00
Gary, Ind. U5 .....99.50
Geneva, Utah C11 ....99.50
Houston S5 .....104.50
Johnstown, Pa. B2 ....99.50
Lackawanna, N.Y. B2 ..99.50
LosAngeles B3 .....109.00
Midland, Pa. C18 .....99.50
Munhall, Pa. U5 .....99.50
Owensboro, Ky. C8 ....99.50
Seattle B3 .....109.00
Sharon, Pa. S3 .....99.50
S. Chicago R2, U5, W14 .99.50
S. Duquesne, Pa. U5 ....99.50
S. SanFrancisco B3 ....109.00
Warren, O. C17 .....99.50

Alloy, Forging (NT)

BethlehemPa. B2 ...$119.00
Bridgeport, Conn. C32 ..119.00
Buffalo R2 .....119.00
Canton, O. R2, T7 ....119.00
Conshohocken, Pa. A3 .126.00
Detroit S41 .....119.00
Economy, Pa. B14 ....119.00
Farrell, Pa. S3 .....119.00
Fontana, Calif. K1 ....140.00
Gary, Ind. U5 .....119.00
Houston S5 .....124.00
Ind. Harbor, Ind. Y1 ..119.00
Johnstown, Pa. B2 ....119.00
Lackawanna, N.Y. B2 ..119.00
LosAngles B3 .....139.00
Lowellville, O. S3 .....119.00
Massillon, O. R2 .....119.00
Midland, Pa. C18 .....119.00
Munhall, Pa. U5 .....119.00
Owensboro, Ky. G8 ....119.00
Seattle(6) B3 .....140.00
Sharon, Pa. S3 .....119.00
S. Chicago R2, U5, W14 .119.00
S. Duquesne, Pa. U5 ...119.00
Struthers, O. Y1 .....119.00
Warren, O. C17 .....119.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2 .....$122.50
Canton, O. R2 .....125.00
Cleveland R2 .....122.50
Gary, Ind. U5 .....122.50
S. Chicago, Ill. R2, W14 .122.50
S. Duquesne, Pa. U5 ...122.50
Warren, O. C17 .....122.50

SKELP

Aliquippa, Pa. J5 .....5.05
Benwood, W.Va. W10 ....5.05
Ind. Harbor, Ind. Y1 ....5.05
Munhall, Pa. U5 .....5.05
Pittsburgh J5 .....5.05
Warren, O. R2 .....5.05
Youngstown R2, U5 ....5.05

WIRE RODS

AlabamaCity, Ala. R2 ...6.40
Aliquippa, Pa. J5 .....6.40
Alton, Ill. L1 .....6.60
Bartonville, Ill. K4 .....6.50
Buffalo W12 .....6.40
Cleveland A7 .....6.40
Donora, Pa. A7 .....6.40
Fairfield, Ala. T2 .....6.40
Houston S5 .....6.65
IndianaHarbor, Ind. Y1 .6.40
Johnstown, Pa. B2 .....6.40
Joliet, Ill. A7 .....6.40
KansasCity, Mo. S5 ....6.65
Kokomo, Ind. C16 .....6.50
LosAngeles B3 .....7.20
Minnequa, Colo. C10 ....6.65
Monessen, Pa. P7 .....6.40
Pittsburg, Calif. C11 ....7.20
Portsmouth, O. P12 ....6.40
Roebling, N.J. R5 .....6.50
S. Chicago, Ill. R2, W14..6.40
SparrowsPoint, Md. B2..6.50
Sterling, Ill. (1) N15 ....6.40
Sterling, Ill. N15 .....6.50
Struthers, O. Y1 .....6.40
Worcester, Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes

AlabamaCity, Ala. R2 ...5.50
Aliquippa, Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer, Ala. T2 .....5.50
Bethlehem, Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton, Pa. U5 .....5.50
Fairfield, Ala. T2 .....5.50
Fontana, Calif. K1 .....6.30
Gary, Ind. U5 .....5.50
Geneva, Utah C11 .....5.50
Houston S5 .....5.60
Ind. Harbor, Ind. I-2, Y1.5.50
Johnstown, Pa. B2 .....5.55
Joliet, Ill. P22 .....5.50
KansasCity, Mo. S5 .....5.60
Lackawanna, N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa, Colo. C10 ....5.80
Munhall, Pa. U5 .....5.50
Niles, Calif. P1 .....6.25
Phoenixville, Pa. P4 ....5.55
Portland, Oreg. O4 .....6.25
Seattle B3 .....6.25
S. Chicago, Ill. U5, W14 .5.50
S. SanFrancisco B3 .....6.15
Sterling, Ill. N15 .....5.50
Torrance, Calif. C11 ....6.20
Weirton, W.Va. W6 .....5.50

Wide Flange

Bethlehem, Pa. B2 .....5.55
Clairton, Pa. U5 .....5.50
Fontana, Calif. K1 .....6.45
IndianaHarbor, Ind. I-2..5.50
Lackawanna, N.Y. B2 ..5.55
Munhall, Pa. U5 .....5.50
Phoenixville, Pa. P4 ....5.55
S. Chicago, Ill. U5 .....5.50
Sterling, Ill. N15 .....5.50
Weirton, Wa. Va. W6 ....5.50

Alloy Std. Shapes

Aliquippa, Pa. J5 .....6.80
Clairton, Pa. U5 .....6.80
Gary, Ind. U5 .....6.80
Houston S5 .....6.90
Munhall, Pa. U5 .....6.80
S. Chicago, Ill. U5, W14..6.80

H.S., L.A., Std. Shapes

Aliquippa, Pa. J5 .....8.05
Bessemer, Ala. T2 .....8.05
Bethlehem, Pa. B2 .....8.10
Clairton, Pa. U5 .....8.05
Fairfield, Ala. T2 .....8.05
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.05
Geneva, Utah C11 .....8.05
Houston S5 .....8.15
Ind. Harbor, Ind. I-2, Y1..8.05
Johnstown, Pa. B2 .....8.10
KansasCity, Mo. S5 .....8.15
Lackawanna, N.Y. B2 ..8.10
LosAngeles B3 .....8.75
Munhall, Pa. U5 .....8.05
Phoenixville, Pa. P4 ....8.10
Seattle B3 .....8.80
S. Chicago, Ill. U5, W14..8.05
S. SanFrancisco B3 .....8.70
Sterling, Ill. N15 .....7.75
Struthers, O. Y1 .....8.05

H.S., L.A., Wide Flange

Bethlehem, Pa. B2 .....8.10
Ind. Harbor, Ind. I-2 ....8.05
Lackawanna, N.Y. B2 ..8.10
Munhall, Pa. U5 .....8.05
S. Chicago, Ill. U5 .....8.05
Sterling, Ill. N15 .....7.75

PILING

BEARING PILES

Bethlehem, Pa. B2 .....5.55
Ind. Harbor, Ind. I-2 ....5.50
Lackawanna, N.Y. B2 ..5.55
Munhall, Pa. U5 .....5.50
S. Chicago, Ill. I-2, U5 ..5.50

STEEL SHEET PILING

Ind. Harbor, Ind. I-2 ....6.50
Lackawanna, N.Y. B2 ..6.50
Munhall, Pa. U5 .....6.50
S. Chicago, Ill. I-2, U5 ..6.50
Weirton, W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel

AlabamaCity, Ala. R2 ...5.30
Aliquippa, Pa. J5 .....5.30
Ashland, Ky. (15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer, Ala. T2 .....5.30
Clairton, Pa. U5 .....5.30
Claymont, Del. P4 .....5.30
Cleveland J5, R2 .....5.30
Coatesville, Pa. L7 .....5.30
Conshohocken, Pa. A3 ..5.30
Ecorse, Mich. G5 .....5.30
Fairfield, Ala. T2 .....5.30
Farrell, Pa. S3 .....5.30
Fontana, Calif. (30) K1 ..6.10
Gary, Ind. U5 .....5.30
Geneva, Utah C11 .....5.30
GraniteCity, Ill. G4 .....5.40
Houston S5 .....5.40
Ind. Harbor, Ind. I-2, Y1..5.30
Johnstown, Pa. B2 .....5.30
Lackawanna, N.Y. B2 ..5.30
Mansfield, O. E6 .....5.30
Minnequa, Colo. C10 ....6.15
Munhall, Pa. U5 .....5.30
Newport, Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale, Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon, Pa. S3 .....5.30
S. Chicago, Ill. U5, W14..5.30
SparrowsPoint, Md. B2 ..5.30
Sterling, Ill. N15 .....5.30
Steubenville, O. W10 ....5.30
Warren, O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 .....5.30

PLATES, Carbon Abras. Resist.

Claymont, Del. P4 .....7.05
Fontana, Calif. K1 .....7.85
Geneva, Utah C11 .....7.05
Houston S5 .....7.15
Johnstown, Pa. B2 .....7.05
SparrowsPoint, Md. B2 ..7.05

PLATES, Wrought Iron

Economy, Pa. B14 ....14.10

PLATES, H.S., L.A.

Aliquippa, Pa. J5 .....7.95
Ashland, Ky. A10 .....7.95
Bessemer, Ala. T2 .....7.95
Clairton, Pa. U5 .....7.95
Claymont, Del. P4 .....7.95
Cleveland J5, R2 .....7.95
Coatesville, Pa. L7 .....7.95
Conshohocken, Pa. A3 ..7.95
Economy, Pa. B14 .....7.95
Ecorse, Mich. G5 .....7.95
Fairfield, Ala. T2 .....7.95
Farrell, Pa. S3 .....7.95
Fontana, Calif. (30) K1 ..8.75
Gary, Ind. U5 .....7.95
Geneva, Utah C11 .....7.95
Houston S5 .....8.05
Ind. Harbor, Ind. I-2, Y1..7.95
Johnstown, Pa. B2 .....7.95
Munhall, Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon, Pa. S3 .....7.95
S. Chicago, Ill. U5, W14..7.95
SparrowsPoint, Md. B2 ..7.95
Sterling, Ill. N15 .....7.625
Warren, O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy

Aliquippa, Pa. J5 .....7.50
Claymont, Del. P4 .....7.50
Coatesville, Pa. L7 .....7.50
Economy, Pa. B14 .....7.50
Farrell, Pa. S3 .....7.50
Fontana, Calif. K1 .....8.30
Gary, Ind. U5 .....7.50
Houston S5 .....7.60
Ind. Harbor, Ind. Y1 .....7.50
Johnston, Pa. B2 .....7.50
Lowellville, O. S3 .....7.50
Munhall, Pa. U5 .....7.50
Newport, Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon, Pa. S3 .....7.50
S. Chicago, Ill. U5, W14..7.50
SparrowsPoint, Md. B2 ..7.50
Youngstown Y1 .....7.50

FLOOR PLATES

Cleveland J5 .....6.375
Claymont, Del. P4 .....6.375
Conshohocken, Pa. A3 ..6.375
Ind. Harbor, Ind. I-2 ...6.375
Munhall, Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S. Chicago, Ill. U5 ....6.375

PLATES, Ingot Iron

Ashland c.l. (15) A10 ...5.55
Ashland l.c.l. (15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren, O. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala. City, Ala. (9) R2 ...5.675
Aliquippa, Pa. (9) J5 ...5.675
Alton, Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer, Ala. (9) T2 ...5.675
Birmingham(9) C15 ....5.675
Buffalo(9) R2 .....5.675
Canton, O. (23) R2 .....6.15
Clairton, Pa. (9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse, Mich. (9) G5 ....5.675
Emeryville, Calif. J7 ...6.425
Fairfield, Ala. (9) T2 ...5.675
Fairless, Pa. (9) U5 ....5.825
Fontana, Calif. (9) K1 ..6.375
Gary, Ind. (9) U5 .....5.675
Houston(9) S5 .....5.925
Ind. Harbor(9) I-2, Y1..5.675
Johnstown, Pa. (9) B2 ..5.675
Joliet, Ill. P2 .....5.675
KansasCity, Mo. (9) S5..5.925
Lackawanna(9) B2 ....5.675
LosAngeles(9) B3 .....6.375
Massillon, O. (23) R2 ....6.15
Midland, Pa. (23) C18 ...6.025
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10 ....6.125
Niles, Calif. P1 .....6.375
Owensboro, Ky. (9) G8 ...6.025
Pittsburg, Calif. (9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland, Oreg. O4 .....6.425
Riverdale, Ill. (9) A1 ....5.675
Seattle(9) A24, B3, N15 .6.425
S. Ch'c'go(9) R2, U5, W14 5.675
S. Duquesne, Pa. (9) U5..5.675
S. SanFran., Calif. (9) B3 6.425
Sterling, Ill. (1) (9) N15..5.675
Sterling, Ill. (9) N15 ....5.775
Struthers, O. (9) Y1 .....5.675
Tonawanda, N.Y. B12 ...5.675
Torrance, Calif. (9) C11 .6.375
Warren, O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy

Aliquippa, Pa. J5 ....6.725
Bethlehem, Pa. B2 .....6.725
Bridgeport, Conn. C32 ...6.80
Buffalo R2 .....6.725
Canton, O. R2, T7 .....6.725
Clairton, Pa. U5 .....6.725
Detroit S41 .....6.725
Economy, Pa. B14 .....6.725
Ecorse, Mich. G5 .....6.725
Farrell, Pa. S3 .....6.725
Fontana, Calif. K1 ....7.775
Gary, Ind. U5 .....6.725
Houston S5 .....6.975
Ind. Harbor, Ind. I-2, Y1 6.725
Johnstown, Pa. B2 .....6.725
KansasCity, Mo. S5 ....6.975
Lackawanna, N.Y. B2 ..6.725
LosAngeles B3 .....7.775
Lowellville, O. S3 .....6.725
Massillon, O. R2 .....6.725
Midland, Pa. C18 .....6.725
Owensboro, Ky. G8 ....6.725
Pittsburgh J5 .....6.725
Seattle(6) B3 .....7.825
Sharon, Pa. S3 .....6.725
S. Chicago R2, U5, W14..6.725
S. Duquesne, Pa. U5 ....6.725
Struthers, O. Y1 .....6.725
Warren, O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....8.30
Bessemer, Ala. T2 .....8.30
Bethlehem, Pa. B2 .....8.30
Clairton, Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse, Mich. G5 .....8.30
Fairfield, Ala. T2 .....8.30
Fontana, Calif. K1 ....9.00
Gary, Ind. U5 .....8.30
Houston S5 .....8.55
Ind. Harbor, Ind. Y1 ....8.30
Johnstown, Pa. B2 .....8.30
KansasCity, Mo. S5 ....8.55
Lackawanna, N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S. Chicago, Ill. R2, W14..8.30
S. Duquesne, Pa. U5 ....8.30
S. SanFrancisco B3 .....9.05
Sterling, Ill. N15 .....7.925
Struthers, O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon

Bethlehem, Pa. (9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity, Mo. (9) S5..5.925
Lackawanna(9) B2 ....5.675
Sterling, Ill. N15 .....5.775
Sterling, Ill. (1) N15 ....5.675
Tonawanda, N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES

Aliquippa, Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet, Ill. P22 .....5.675
Minnequa, Colo. C10 ...6.125
Niles, Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SIZE ANGLES; S. SHAPES Wrought Iron

Economy, Pa. B14 .....16.45

BAR SHAPES, Hot-Rolled Alloy

Aliquippa, Pa. J5 .....6.80
Clairton, Pa. U5 .....6.80
Gary, Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity, Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Leaded (Including leaded extra) Carbon

LosAngeles P2, S30 ..11.75*

Alloy

Ambridge, Pa. W18 ...10.175
BeaverFalls, Pa. M12 ..10.175
Camden, N.J. P13 .....10.35
Chicago W18 .....10.175
Elyria, O. W8 .....10.175
Monaca, Pa. S17 .....10.175
Newark, N.J. W18 .....10.35
SpringCity, Pa. K3 .....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon

Ambridge, Pa. W18 ....7.65
BeaverFalls, Pa. M12, R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden, N.J. P13 .....8.10
Carnegie, Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora, Pa. A7 .....7.65
Elyria, O. W8 .....7.65
FranklinPark, Ill. N5 ...7.65
Gary, Ind. R2 .....7.65
GreenBay, Wis. F7 .....7.65
Hammond, Ind. J5, L2 ..7.65
Hartford, Conn. R2 ....8.15
Harvey, Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield, Mass. B5 ....8.20
Massillon, O. R2, R8 ....7.65
Midland, Pa. C18 .....7.65
Monaca, Pa. S17 .....7.65
Newark, N.J. W18 .....8.10
NewCastle, Pa. (17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth, Mich. P5 .....7.90
Putnam, Conn. W18 ....8.20
Readville, Mass. C14 ....8.20
Seattle(49) S30 .....9.10
S. Chicago, Ill. W14 ....7.65
SpringCity, Pa. K3 ....8.10
Struthers, O. Y1 .....7.65
Warren, O. C17 .....7.65
Waukegan, Ill. A7 .....7.65
Willimantic, Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Alloy (Turned and Ground)

Cumberland, Md. (5) C19..6.55

BARS, Cold-Finished Alloy

Ambridge, Pa. W18 ...9.025
BeaverFalls, Pa. M12, R2 9.025
Bethlehem, Pa. B2 .....9.025
Bridgeport, Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden, N.J. P13 .....9.20
Canton, O. T7 .....9.025
Carnegie, Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora, Pa. A7 .....9.025
Elyria, O. W8 .....9.025
FranklinPark, Ill. N5 ...9.025
Gary, Ind. R2 .....9.025
GreenBay, Wis. F7 .....9.025
Hammond, Ind. J5, L2..9.025
Hartford, Conn. R2 ....9.325
Harvey, Ill. R5 .....9.025
Lackawanna, N.Y. B3 ...9.025
LosAngeles P2, S30 ....11.00
Mansfield, Mass. B5 ....9.325
Massillon, O. R2, R8 ...9.025
Midland, Pa. C18 .....9.025
Monaca, Pa. S17 .....9.025
Newark, N.J. W18 .....9.20
Plymouth, Mich. P5 .....9.225
S. Chicago, Ill. W14 ....9.025
SpringCity, Pa. K3 .....9.20

Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ...9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ..6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.50
Gary,Ind. U5 .....5.675
Houston S5 .....5.675
Ind.Harbor,Ind. I-2, Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.675
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 ....6.425
SandSprings,Okla. S5 ..5.675
Seattle A24, B3, N14 ..6.425
S.Chicago,Ill. R2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Steelton,Pa. B2 .....5.675
Sterling,Ill. (1) N15 ...5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ...6.10
Torrance,Calif. C11 ..6.375
Youngstown R2, U5 ..5.675

BARS, Reinfocing, Billet (Fabricated: to Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.35
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5. ..7.35
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 ....7.35
SandSprings,Okla. S5 ...7.35
Seattle A24, B3, N14 ..7.95
SparrowsPoint,Md. B2 ..7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(Direct Rolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5 .20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ....5.675
Franklin,Pa.(3) F5 ....5.575
Franklin,Pa.(4) F5 ....5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 ....5.575
Tonawanda(3) B12 ...5.575
Tonawanda(4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ...5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ..5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H. R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 ....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ...7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowPoint (36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 ....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ..7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ...6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Yorkville,O. W10 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irwin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel

Follansbee,W.Va. W10 .7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3 .....7.225
Warren,O. R2 .....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1) ..9.525

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325
Geneva,Utah C11 .....6.80

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

Sheets, Galvannealed Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 ....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2..6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.
A25 Algoma Steel Corp. Ltd.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply, Armco Steel Corp.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America
S45 Somers Brass Co.
S46 Steel Co. of Canada

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope, Armco Steel Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloy Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2 ...5.10
Allenport, Pa. P7 .....5.10
Alton, Ill. L1 .....5.30
Ashland, Ky. (8) A10 ...5.10
Atlanta A11 .....5.10
Bessemer, Ala. T2 .....5.10
Birmingham C15 .....5.10
Conshohocken, Pa. A3 ...5.15
Detroit M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala T2 .....5.10
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....5.10
Ind. Harbor, Ind. I-2, Y1..5.10
Johnstown, Pa. (25) B2..5.10
Lackaw'na, N.Y. (25) B2.5.10
LosAngeles (25) B3 ....5.85
LosAngeles C1 .....8.60
Minnequa, Colo. C10 ....6.20
Riverdale, Ill. A1 .....5.10
SanFrancisco S7 .....6.60
Seattle (25) B3 .....6.10
Seattle N14 .....6.60
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. W14 .....5.10
S. SanFrancisco (25) B3 ..5.85
SparrowsPoint, Md. B2 ..5.10
Torrance, Calif. C11 ....5.85
Warren, O. R2 .....5.10
Weirton, W. Va. W6 ....5.10
Youngstown U5 .....5.10

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.40
Farrell, Pa. S3 .....8.40
Gary, Ind. U5 .....8.40
Houston S5 .....8.65
Ind. Harbor, Ind. Y1 ....8.40
KansasCity, Mo. S5 ....8.65
LosAngeles B3 .....9.60
Lowellville, O. S3 .....8.40
Newport, Ky. A2 .....8.40
Sharon, Pa. A2, S3 ....8.40
S. Chicago, Ill. W14 .....8.40
Youngstown U5, Y1 ....8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland, Ky. A10 .....7.575
Bessemer, Ala. T2 ....7.575
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.575
Fairfield, Ala. T2 .....7.575
Farrel, Pa. S3 .....7.575
Gary, Ind. U5 .....7.575
Ind. Harbor, Ind. I-2, Y1 7.575
Lackawanna, N.Y. B2 ..7.575
LosAngeles (25) B3 ....8.325
Seattle (25) B3 .....8.575
Sharon, Pa. S3 .....7.575
S. Chicago, Ill. W14 ....7.575
S. SanFrancisco (25) B3..8.325
SparrowsPoint, Md. B2 .7.575
Warren, O. R2 .....7.575
Weirton, W. Va. W6 ....7.575
Youngstown U5, Y1 ....7.575

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ....5.35
Warren, O. R2 .....5.875

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.425
Baltimore T6 .....7.425
Boston T6 .....7.975
Buffalo S40 .....7.425
Cleveland A7, J5 .....7.425
Dearborn, Mich. S3 ....7.425
Detroit D2, M1, P20 ..7.425
Dover, O. G6 .....7.425
Evanston, Ill. M22 ....7.525
Farrell, Pa. S3 .....7.425
Follansbee, W. Va. W10 .7.425
Fontana, Calif. K1 ....9.20
FranklinPark, Ill. T6 ..7.525
Ind. Harbor, Ind. Y1 ....7.425
Indianapolis S41 .....7.575
Los Angeles C1, S41 ....9.30
McKeesport, Pa. E10 ..7.525
NewBedford, Mass. R10 .7.875
NewBritain, Conn. S15 .7.875
NewCastle, Pa. B4, M23 7.425
NewHaven, Conn. D2 ...7.875
NewKensington, Pa. A6 .7.425
Pawtucket, R.I. R3, N8 .7.975
Philadelphia P24 .....7.875
Pittsburgh J5 .....7.425
Riverdale, Ill. A1 .....7.525
Rome, N.Y. (32) R6 ....7.425
Sharon, Pa. S3 .....7.425
Thenton, N.J. (31) R5 ..8.875
Warren, O. R2, T5 ....7.425
Worcester, Mass. A7 ...7.975

STRIP, Cold-Rolled Alloy

Boston T6 .....15.90
Cleveland A7 .....15.55
Carnegie, Pa. S18 .....15.55
Dover, O. G6 .....15.55
Farrell, Pa. S3 .....15.55
FranklinPark, Ill T6 ..15.55
Harrison, N.J. S18 ....15.55
Indianapolis S41 .....15.70
LosAngeles S41 .....17.75
Lowellville, O. S3 .....15.55
Pawtucket, R.I. S8 ....15.90
Riverdale, Ill. A1 .....15.55
Sharon, Pa. S3 .....15.55
Worcester, Mass. A7 ...15.85
Youngstown S41 .....15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.80
Dearborn, Mich. S3 ....10.80
Dover, O. G6 .....10.80
Farrell, Pa. S3 .....10.80
Ind. Harbor, Ind. Y1 ....10.80
Sharon, Pa. S3 .....10.80
Warren, O. R2 .....10.80
Weirton, W. Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Galvanized (Continuous)

Farrell, Pa. S3 .....7.50
Sharon, Pa. S3 .....7.50

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson, Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	9.05	10.40	12.60	15.60	....
Farrell, Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria, O. S1	10.05	10.40	12.60	15.60	....
FranklinPark, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison, N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain, Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle, Pa. B4, M23	8.95	10.40	12.60	15.60	....
NewHaven, Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington, Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	....	10.70	12.90	15.90	18.85
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	...	...	18.85	22.95	27.80
Buffalo W12	...	...	18.85	....	....
Fostoria, O. S1	...	...	19.06	22.15	....
FranklinPark, Ill. T6	...	...	19.20	23.30	28.15
Harrison, N.J. C18	...	...	18.85	22.95	27.80
NewYork W3	...	...	18.85	22.95	27.80
Palmer, Mass. W12	...	...	18.85	....	....
Trenton, N.J. R5	...	...	18.85	22.95	27.80
Worcester, Mass. A7, T6	...	...	18.85	22.95	27.80
Youngstown S41	...	...	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7 .....7.425*
Dover, O. G6 .....7.425*
Evanston, Ill. M22 ....7.525*
McKeesport, Pa. E10 ...7.50*
NewCastle, Pa. M23 ..7.425*
Riverdale, Ill. A1 ....7.525*
Warren, O. B9, S3, T5 .7.425*
Worcester, Mass. A7 ...7.975
Youngstown S41, Y1 .7.425*

*Plus galvanizing extras.

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....8.175

TIGHT COOPERAGE HOOP

Atlanta A11 .....5.825
Farrell, Pa. S3 .....5.525
Riverdale, Ill. A1 .....5.675
Sharon, Pa. S3 .....5.525
Youngstown U5 .....5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box) Common Coke	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$9.10	$9.35	$9.75
Fairfield, Ala. T2	9.20	9.45	9.85
Fairless, Pa. U5	9.20	9.45	9.85
Fontana, Calif. K1	9.75	10.00	10.40
Gary, Ind. U5	9.10	9.35	9.75
GraniteCity, Ill. G4	9.20	9.45	9.85
IndianaHarbor, Ind. I-2, Y1	9.10	9.35	9.75
Irvin, Pa. U5	9.10	9.35	9.75
Niles, O. R2	9.10	9.35	9.75
Pittsburg, Calif. C11	9.75	10.00	10.40
SparrowsPoint, Md. B2	9.10	9.35	9.75
Weirton, W. Va. W6	9.10	9.35	9.75
Yorkville, O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa, Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor, Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles, O. R2 (20-27 Ga.)	7.90	8.10	8.30

ELECTROLYTIC THIN TIN PLATE (¼ lb coating in coils)

	Base Box 45 lb	50 lb	55 lb	60 lb
Fairfield, Ala. T2	$6.20	$6.35	$6.50	$6.65
Fairless, Pa. U5	6.20	6.35	6.50	6.65
Gary, Ind. U5	6.10	6.25	6.40	6.55
Irvin, Pa. U5	6.10	6.25	6.40	6.55
SparrowsPoint, Md. B2	6.10	6.25	6.40	6.55
Weirton, W. Va. W6	6.10	6.25	6.40	6.55

TIN PLATE, Hot Dipped 1.25 lb Common Coke	1.50 lb
Aliquippa, Pa. J5	$10.40	$10.65
Fairfield, Ala. T2	10.50	10.75
Fontana, Calif. K1	11.05	11.30
Gary, Ind. U5	10.40	10.65
Irvin, Pa. U5	10.40	10.65
Pitts., Calif. C11	11.05	11.30
Sp. Pt., Md. B2	10.40	10.65
Weirton, W. Va. W6	10.40	10.65
Yorkville, O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa, Pa. J5 .....$8.20
Fairfield, Ala. T2 .....8.30
Fairless, Pa. U5 .....8.30
Fontana, Calif. K1 .....8.85
Gary, Ind. U5 .....8.20
GraniteCity, Ill. G4 .....8.30
Ind. Harbor, Ind. I-2, Y1..8.20
Irvin, Pa. U5 .....8.20
Niles, O. R2 .....8.20
Pittsburg, Calif. C11 ....8.85
SparrowsPoint, Md. B2 ..8.20
Weirton, W. Va. W6 ....8.20
Yorkville, O. W10 .....8.20

HOLLOWARE ENAMELING (Black Plate) (29 Gage)

Aliquippa, Pa. J5 .....7.85
Gary, Ind. U5 .....7.85
GraniteCity, Ill. G4 .....7.95
Ind. Harbor, Ind. Y1 ....7.85
Irvin, Pa. U5 .....7.85
Yorkville, O. W10 .....7.85

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.) Fully Processed (Semiprocessed ⅓c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom, W. Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge, Pa. A4	....	....	12.40	13.55	14.65
GraniteCity, Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor, Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield, O. E6	9.875*	11.70	12.40	13.55	14.65
Newport, Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles, O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift, Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren, O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville, O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Mansfield, O. E6	8.10
Vandergrift, Pa. U5	8.10
Warren, O. R2 (Locore)	8.10

SHEETS (22 Ga., coils & cut lengths) Fully Processed (Semiprocessed ⅓c lower)	T-72	T-65	T-58	T-52
BeechBottom, W. Va. W10	15.70	16.30	16.80	17.85
Zanesville, O. A10	15.70	16.30	16.80	17.85
Vandergrift, Pa. U5	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler, Pa. A10	....	....	....	19.70	20.20	20.70	....
Vandergrift, Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren, O. R2	....	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coil annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity, Ala. R2 ..8.00
Aliquippa, Pa. J5 .....8.00
Alton, Ill. L1 .....8.20
Atlanta A1 .....8.00
Bartonville, Ill. K4 .....8.10
Buffalo W12 .....8.00
Chicago W13 .....8.00
Cleveland A7, C20 ....8.00
Crawfordsville, Ind. M8..8.10
Donora, Pa. A7 .....8.00
Duluth A7 .....8.00
Fairfield, Ala. T2 .....8.00
Fostoria, O. (24) S1 ....8.10
Houston S5 .....8.25
Jacksonville, Fla. M8 ...8.35
Johnstown, Pa. B2 .....8.00
Joliet, Ill. A7 .....8.00
KansasCity, Mo. S5 ....8.25
Kokomo, Ind. C16 .....8.10
LosAngeles B3 .....8.95
Minnequa, Colo. C10 ....8.25
Monessen, Pa. P7, P16 ..8.00
Palmer, Mass. W12 ....8.30
Pittsburg, Calif. C11 ....8.95
Portsmouth, O. P12 .....8.00
S. Chicago, Ill. R2 .....8.00
S. SanFrancisco C10 ....8.95
SparrowsPoint, Md. B2...8.10
Sterling, Ill. (1) N15 ....8.00
Sterling, Ill. N15 .....8.10
Struthers, O. Y1 .....8.00
Waukegan, Ill. A7 .....8.00
Worcester, Mass. A7 ....8.30

WIRE, Cold Heading Carbon

Elyria, O. W8 .....8.00

WIRE, Gal'd., for ACSR

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....13.40
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. (10) B2.12.65
KansasCity, Mo. U3 ...12.90
LosAngeles (2) B3 ....13.60
Minnequa, Colo. C10 ..12.775
Monessen, Pa. P7, P16..12.65
Muncie, Ind. I-7 .....13.60
NewHaven, Conn. A7 ..12.95
Palmer, Mass. W12 ....13.70
Pittsburg, Calif. C11 ....13.45
Portsmouth, O. P12 ....12.65
Roebling, N.J. R5 .....12.95
SparrowsPt., Md. (10) B2 12.75
Struthers, O. Y1 .....13.40
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
Kokomo, Ind. C16 ....9.85
LosAngeles B3 .....10.70
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
NewHaven, Conn. A7 ...10.05
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ....10.70
SparrowsPt., Md. B2 ...9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Worcester, Mass. A7 ...10.05

WIRE, MB Spring, High-Carbon

Aliquippa, Pa. J5 .....9.75
Alton, Ill. L1 .....9.95
Bartonville, Ill. K4 ....9.85
Buffalo W12 .....9.75
Cleveland A7 .....9.75
Donora, Pa. A7 .....9.75
Duluth A7 .....9.75
Fostoria, O. S1 .....9.80
Johnstown, Pa. B2 .....9.75
KansasCity, Mo. S5, U3.10.00
LosAngeles B3 .....10.70
Milbury, Mass. (12) N6 .10.05
Minnequa, Colo. C10 ....9.95
Monessen, Pa. P7, P16 ..9.75
Muncie, Ind. I-7 .....9.95
Palmer, Mass. W12 ....10.05
Pittsburg, Calif. C11 ...10.70
Portsmouth, O. P12 .....9.75
Roebling, N.J. R5 .....10.05
S. Chicago, Ill. R2 .....9.75
S. SanFrancisco C10 ...10.70
SparrowsPt., Md. B2 ....9.85
Struthers, O. Y1 .....9.75
Trenton, N.J. A7 .....10.05
Waukegan, Ill. A7 .....9.75
Wor'ster, Mass. A7, J4, T6 10.05

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....16.50
Bartonville, Ill. K4 ....16.40
Chicago W13 .....16.30
Cleveland A7 .....16.30
Crawfordsville, Ind. M8.16.40
Fostoria, O. S1 .....16.30
Houston S5 .....16.55
Jacksonville, Fla. M8 ..16.65
Johnstown, Pa. B2 .....16.30
KansasCity, Mo. S5 .....16.55
Kokomo, Ind. C16 .....16.30
Minnequa, Colo. C16 ....16.55
Monessen, Pa. P16 .....16.30
Muncie, Ind. I-7 .....16.50
Palmer, Mass. W12 ....16.60
S. SanFrancisco C10 ...17.15
Waukegan, Ill. A7 .....16.30
Worcester, Mass. A7, J6.16.60

ROPE WIRE (A)

Bartonville, Ill. K4 ....13.45
Buffalo W12 .....13.45
Fostoria, O. S1 .....13.45
Johnstown, Pa. B2 .....13.45
Monessen, Pa. P7 .....13.45
Muncie, Ind. I-7 .....13.65
Palmer, Mass. W12 ....13.75
Portsmouth, O. P12 .....13.45
Roebling, N.J. R5 .....13.75
St. Louis L8 .....13.45
SparrowsPt., Md. B2 ...13.55
Struthers, O. Y1 .....13.45
Worcester, Mass. J4 ....13.75
(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Evanston,Ill. M22	12.45
Farrell,Pa. S3	12.25
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
NewCastle,Pa. M23	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7, T6	12.65

NAILS, Stock Sizes	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, CUT (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.) (per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.26
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Ali'ppa,Pa. J5	17.85	19.65
Bartonville K4	17.95	19.80
Chicago W13	17.85	
Cleveland A7	17.85	
Craw'sville M8	17.95	19.80†‡
Fostoria,O. S1	18.35	19.90†
Houston S5	18.10	19.65**
Jacksonville M8	18.95	19.80†‡
Johnstown B2	17.85	19.65§
Kan.City,Mo. S5	18.10	
Kokomo C16	17.95	19.50†
Minnequa C10	18.10	19.65**
P'lm'r,Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
St'ling(37) N15	17.95	19.80
SparrowsPt. B2	17.95	19.75§
Waukegan A7	17.85	19.40†
Worcester A7	18.15	

WOVEN FENCE, 9-15 Ga.	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga. J5	190§
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(42) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A1	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	9.00	9.55**
Aliquippa J5	8.65	9.325§
Atlanta (48) A11	9.00	9.75*
Bartonville(48)K4	9.85	19.90
Buffalo W12	9.00	9.55†
Chicago W13	9.00	9.55**
Cleveland A7	9.00	
Crawfordsville M8	9.10	9.80††
Donora,Pa. A7	9.00	9.55†
Duluth A7	9.00	9.55†
Fairfield T2	9.00	9.55†
Houston(48) S5	9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown(48) B2	9.00	9.675§
Joliet,Ill. A7	9.00	9.55†
KansasCity(48)S5	9.25	9.80**
Kokomo(48) S16	9.10	9.65†
LosAngeles B3	9.95	10.625§
Minnequa C10	9.25	9.80**
Monessen(48) P7	8.65	9.35§
Palmer,Mass. W12	9.30	9.85†
Pitts.,Calif. C11	9.95	10.50†
Rankin,Pa. A7	9.00	9.55†
S.Chicago R2	9.00	9.55**
S.SanFran. C10	9.95	10.50**
Spar'swsPt.(48)B2	9.10	9.775§
St'ling(37)(48)N15	9.10	9.80
Struthers,O. Y1	9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc prices of: *13.50c. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras.

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15% off list.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packaged	+55
Bulk	+16

Flat Head Cap Screws:

⅜ in. and smaller, 6 in. and shorter:	
Packaged	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packaged	+ 5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packaged	+29

HEXAGON NUTS: American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ⅛ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.50	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.00	61.30	80.80
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	58.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Double galvanized.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Limited analyses only.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Bethany A coating.
(12) Worcester, Mass., base.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.65c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 40" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds and 2½ in. and smaller hexagons; 9.65c for larger rounds and hexagons and other shapes.

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See the many new expressions of stainless beauty and versatility on display—each with its own message of interest to you in the metals field. Note how stainless steel's strength is matched with corrosion-proof luster, easy formability, every degree of surface finish from mirror-bright to satin-smooth. And for your own stainless fabrication requirements, think of SUPERIOR—ready with the grades, deliveries and technical help to serve every need!

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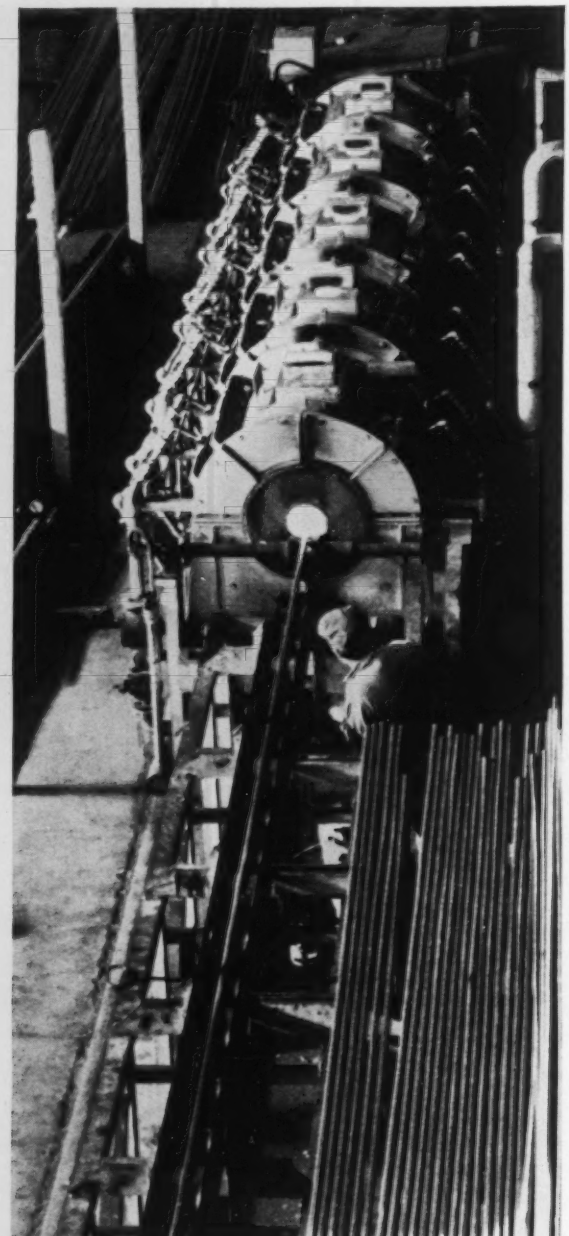
NEW SLANTS ON HEAT PROCESSING FROM SELAS



• *This compact, continuous line of barrel-type furnaces produces highest quality stainless and other bars up to 5¼ inches diameter and lengths to 30 feet.* DURADIANT® *burners heat uniformly at high thermal gradient without flame impingement on the work, resulting in fast heating cycles. Annular ring water-spray quench cools work quickly and evenly.*

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There's good reason why stainless bar and tubing producers everywhere rely on Selas barrel-type furnaces to assure fast, continuous, *uniform* heating. The versatility and adaptability of these Selas job-engineered production units is assured through the use of Selas GRADIATION® . . . the advanced concept and technique of heat processing which coordinates fast, controlled heating with the nature of the workpiece . . . considering size, shape, composition and heat transfer characteristics . . . to develop desired product quality in minimum time, with maximum processing efficiency.

Check these cost-and-time-saving advantages—they tell why more and more stainless steel producers rely on Selas barrel-line furnaces:

- Quick start-up from cold to operating temperature
- High, continuous production rates
- Versatility in processing bar and tubing of varied sizes, shapes and composition
- *Individual*, uniform fast heating and quenching from piece to piece and run to run
- Improved straightness of the annealed product . . . eliminating subsequent manual straightening
- Minimized oxidation, substantially reducing cleaning time
- Automatic operation with simple control equipment
- Minimum floor space requirements
- Low maintenance costs—minimum downtime for repairs

We would welcome the opportunity to discuss how Selas barrel-type furnaces can help in your plant. No obligation, of course. For this personal service, contact our Steel Mill Division, 300 Mt. Lebanon Blvd., Pittsburgh 24, Pa., or our Furnace Division, Dresher.

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SELAS

HEAT AND FLUID PROCESSING ENGINEERS
DEVELOPMENT / DESIGN / CONSTRUCTION

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 12.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	29.50	39.50	40.50	44.25	46.75	45.75	52.00	52.00
304L	....	37.25	47.25	48.25	52.00	54.50	53.50	59.75	59.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	55.25	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	98.75	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Somers Brass Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates: 5% Carbon Base	10% Carbon Base	15% Carbon Base	20% Carbon Base	Sheets: 20% Carbon Base
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	36.10	43.00

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. P4; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
1S	4	1	....	...	T-1	1.840
1S	4	2	....	...	T-2	2.005
1S	4	3	....	...	T-3	2.105
1S.25	4.25	1	4.75	...	T-4	2.545
1S	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.290
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Maximum delivered prices are approximate and based on rail shipment.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham R2	62.00	62.50**	66.50	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.81	69.31	69.31	69.81
Muskegon, Mich., deld.	....	74.46	74.46	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	Nom.	Nom.	Nom.	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.41	75.91	....
Newark, N.J., deld.	72.53	73.03	73.53	74.03
Philadelphia, deld.	70.18	70.68	71.18	71.68
Troy, N.Y., R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), deld.	....	68.31	68.31	68.81
Monaca, Pa., deld.	....	68.33	68.33	68.83
Lawrenceville, W. Homestead, Wilmerding, Pa., deld.	....	68.68	68.68	69.18
Verona, Trafford, Pa., deld.	68.83	69.33	69.33	69.83
Brackenridge, Pa., deld.	69.16	69.66	69.66	70.16
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....

Other U. S. Districts	Basic	No. 2 Foundry	Malle-able	Besse-mer
Duluth I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....
Mansfield, Ohio, deld.	....	....	71.34	....
Canadian District				
Hamilton, Ont. S46	65.00	65.00	65.50	....
Port Colborne, Ont. A25	65.00	65.00	65.50	66.00
Sault Ste. Marie, Ont. A25	65.00	65.00	65.50	66.00

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 13%; starting with silicon over 13% add $1 per ton for each 0.50% silicon or portion thereof up to 14%; over 14%, price is $93 with $1 differential; add $1 for each 0.50% Mn over 1%)

Buffalo H1	$79.25
Jackson, Ohio I-3, J1	78.00
Port Colborne, Ont. A25	78.50
Toledo, Ohio I-3	78.00

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. K2	89.00
Keokuk, Iowa O.H. & Fdry. 12½ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro, Pa. B10 (Phos. 0.075% max)	$73.00
Lyles, Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Swedeland, Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Troy, N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except: Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	7.77	9.61	10.06	....	10.18	8.55	11.70	16.38	9.03	8.34	10.02
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.55	9.30	11.25	55.98	11.00	8.75	11.45	16.30	9.15	8.65	11.10
Charlotte, N. C.	9.87	11.22	10.30	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	9.34	10.26	10.75	65.30	11.71	9.33	11.53	16.27	10.14	9.44	11.68
Cleveland	8.57	9.98	10.92	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.05	11.75	....	10.57	9.03	12.98	16.95	9.26	9.35	11.97
Detroit	9.48	10.46	11.05	52.00	11.76	9.53	11.01	16.23	10.14	9.43	11.61
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	9.65	11.35	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.66	10.64	11.14	....	11.83	9.66	11.09	16.39	10.01	9.50	11.79
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.50	11.20	12.20	61.27	11.20	9.55	14.20	17.35	10.45	9.70	11.70
Memphis, Tenn.	8.98	10.05	....	....	10.64	8.82	12.74	....	9.01	8.66	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	8.92	10.55	10.50	....	11.09	8.90	11.00	16.30	9.26	8.76	11.03
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.40	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.00
Philadelphia	8.35	9.60	10.66	52.71	10.35	8.75	11.95	16.38	8.95	8.70	9.95
Pittsburgh	8.57	9.98	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	9.45	11.30	12.35	....	11.45	9.45	16.65	17.80	10.05	9.60	11.75
St. Louis	8.77	10.53	11.08	....	10.94	8.77	11.28	16.33	9.14	8.77	10.91
St. Paul	9.57	10.24	11.39	....	11.74	9.57	11.49	16.54	9.92	9.41	10.95
San Francisco	10.17	11.69	11.40	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.85	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Los Angeles, Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. & 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ⅝ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $146; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Enaley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Vandalia, Mo., New Salisbury, Ohio, $97; Vanport, Pa., Wellsville, Irondale, Ohio, $100; Clearfield, Pa., Portsmouth, Ohio, $102; St. Louis, Mexico, Mo., $120.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $250; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

St. Louis, $193; Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Clearfield, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore (periclase), $73; Pascagoula, Miss. (periclase), $90.

*—9 in. x 4½ x 2.50 straights.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

——Inches—— Diam	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5½	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.55
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Canadian Steel

(Cents per lb, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon (N.T.):	
Forging	$97.00
Rerolling	78.00
Alloy (N.T.)	115.00
Wire Rods:	
Carbon	5.70
Alloy	6.40
Wire (carload lots):	
Merchant annealed	8.40
Low carbon indus.	7.20
Upholstery spring	8.55
M.B. spring	8.85
Bars & Small Shapes:	
Carbon, merchant	5.30
Carbon, special	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Bars, Reinforcing	5.30

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted.)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‡
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.9% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c.)	
Annealed, 99.5% Fe.	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron:	
90-99.9%, 3 to 20 microns, depending on grade,	88.00-700.00 in standard 200-lb containers; all minus 200 mesh.
Aluminum:	
Atomized, 600-lb drum freight allowed, c.l.	39.80; ton lots 41.80
Brass, 80/20, leaded (60 mesh)	36.50
Bronze powder, 90/10.	54.20
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	1.00
Nickel, all types	0.78-1.06
Nickel-Silver	57.90
Solder	7.50*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	23.20
Cobalt:	Dollars
98.5%, minus 100-300 mesh	1.57-1.58
99.5%, below 5 microns	2.32
Tungsten	nom.
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. §Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.65	$5.90	$5.60	$5.50	$5.80
Bar Size Angles	5.85	6.10	5.80	5.70	6.00
Structural Angles	5.65	5.90	5.60	5.50	5.80
I-Beams	5.60	5.85	5.55	5.45	5.75
Channels	5.60	5.85	5.55	5.45	5.75
Plates (basic bessemer)	5.45	5.80	5.50	5.40	5.70
Sheets, hot rolled and galvanized	Nom.	....	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.20	24.70	24.40	24.40	25.20
Barbed Wire (†)	6.50	6.40	6.40	6.25	6.60
Merchant Bars	5.85	6.10	5.80	5.70	6.00
Hot-Rolled Bands	5.95	6.20	5.90	5.80	6.10
Wire Rods, Thomas Commercial No. 5	5.80	5.85	5.75	5.75	6.00
Wire Rods, O.H., No. 5	6.00	6.05	5.95	5.95	6.25
Bright Common Wire Nails (§)	6.55	6.80	6.50	6.40	6.70

†Per 82 lb net reel. §Per 100-lb keg, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Lump ⅛ in. and up	12.85
Fines, under ⅛ in.	10.72
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

Based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960; increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

New Jersey, concentrates nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	25.00†
Chilean, 62-65%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5% f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.00-19.50*
Domestic, concentrates, f.o.b. milling points	22.00-23.00

Manganese Ore

Mn 46-48%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	35.00-37.00†
Domestic Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.70-3.20
60-65%	3.25-3.45

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

*Before duty. †Nominal.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	34.05
Saginaw, Mich., deld.	35.63
Erie, Pa., ovens	32.00
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.64
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
New Haven, Conn., ovens	31.00
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.45
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.78
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	34.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa., 21-23% Mn, $102.50; 19-21% Mn, 1-3% Si, $100; 16-19% Mn $98. For Neville Island, Pa., prices add $2.50. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.2c from above prices. For 3% grade, Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 58-65%, C 5-7%, Si 4-6%, S 0.03% max., 20.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 58-65%, C 4.25% max., Si 1.0% max., S 0.03%, 21.00c per lb of contained Cr, carlots, lump, bulk, delivered.

Low-Carbon Ferrochrome (Simplex) Cr 63-66% or 68-71%: C 0.025% max., 31.50c; C 0.010% max., 32.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Cr 68-73%: C 0.25% max., 33.00c. Cr 65-71%: C 0.06% max., 32.00c; C 0.10% max, 31.75c; C 0.20% max, 31.50c; C 0.50% max, 31.25c; C 1.0% max, 31.00c; C 1.5%, 30.75c; C 2.0% max, 30.50c, carlots, lump, bulk, delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%), C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). SM x D, carload, bulk, 20.65c per lb of alloy, carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 22.50c per lb contained Cr and 14.60c per lb contained Si; Cr 33-36%, Si 45-48%, C 0.05% max, 22.50c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot packed, 2" x D plate (above ¼" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.7% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lots, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETED ALLOYS

Chromium Briquets: (Weighing approx 3½ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l. packed, bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). $5.25 per lb (all quantities) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ⅛ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorous: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

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STEEL The Metalworking Weekly

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Scrap Price Upturn Accelerates

STEEL's composite on No. 1 heavy melting rises another $1 per ton to $36.67, highest since February, 1960. Activity in exports continues to provide chief market support

Scrap Prices, Page 180

• **Chicago**—Open hearth grades of scrap have advanced $2 to $3 a ton on limited mill purchases. Increases have amounted to about $5 a ton in a two week period; the stronger market was touched off by slightly improved steelmaking prospects and higher bids by brokers on 17,000 tons of No. 1 factory bundles—they'll be produced by district auto stamping plants this month.

Following the bidding, a large mill announced $36 as its March buying price for No. 1 industrial heavy melting steel, which it accepts as returns from its customers. That was $4 higher than it quoted in February. Since then, purchases by other mills have been made of this grade at $38 a ton. There are indications that the market may be leveling off.

• **Pittsburgh** — Although there's less buying here than in surrounding districts, market sentiment continues bullish. Steelmaking operations are at the highest level of the year, about 54 per cent of capacity. Trade sources predict that one of the major consumers will place a new order before April. The combination of better weather and higher prices has increased the flow of scrap into dealers' yards. Bids on railroad lists are expected to be higher than last month's.

• **Philadelphia** — Domestic scrap prices are up $1 a ton on low phos structurals and plates to $41-$44, delivered. No. 1 cupola cast is up to $39. Other prices are unchanged. Export buying continues to sustain prices on the major open hearth grades, despite light domestic purchases and increased yard intake.

• **New York** — Brokers have advanced their buying prices $1 a ton on No. 2 heavy melting steel to $21-$22. The market otherwise is unchanged, due, principally, to support of export trading. Completion of negotiations by Japan for second quarter requirements is expected shortly.

• **Cleveland**—The recent flurry in scrap, attending the disposal of automotive factory bundles at sharply higher prices, has given way to renewed sluggishness. The higher quotations are holding despite the slow steel mill demand. In the Valley, an area steelmaker is reported to have paid $39 for some No. 1 heavy melting industrial material, but other district consumers are resisting the higher prices. No. 1 dealer heavy melting is quoted at about $37 in the Valley.

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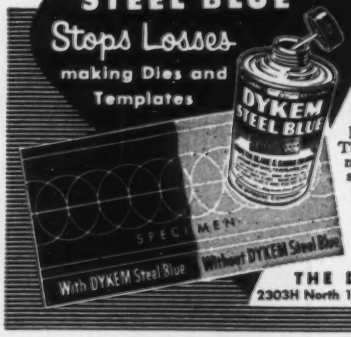

Popular package is 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

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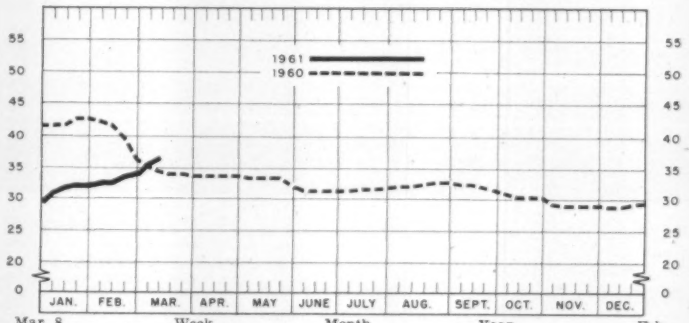
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL.



Mar. 8 1961	Week Ago	Month Ago	Year Ago	Feb. Avg.
$36.67	$35.67	$32.67	$34.33	$33.74

• **Detroit**—No orders are out and the market is quiet. The bulk of the industrial bundles on the March lists were bought for export at a reported $39, delivered. The buy was to fill out orders that will have to be loaded soon. A minimum of 245 cars of bundles were on Chrysler's March list. Some 55 cars were scheduled to come from Ohio plants.

• **Buffalo**—Prices on the primary mill grades are up $2 a ton, based on export demand and strength in other market areas within shipping distance of Buffalo. No. 1 heavy melting is $29-$30, low phos $39-$40, railroad specialties $41-$42, and random length rails $42-$43.

• **Cincinnati**—Two area mills entered the market for tonnage last week, and prices on the principal steelmaking grades are $3 a ton higher than they were a month ago. The tonnages purchased for March shipment were larger than those ordered in recent months. The better prices are bringing out a heavier flow of material to yards. No. 1 heavy melting is quoted by brokers at $30-$31.

• **St. Louis**—Prices jumped $4 and $5 a ton on the open hearth grades last week. Granite City Steel Co. re-entered the market after six months of desultory buying. Exports have been taking tonnage from this district, and domestic buyers are finding it necessary to purchase material for current steel melts.

• **Birmingham**—Two cast iron pipe producers here purchased small tonnages of No. 1 cupola and stove plate at $45-$46 last week, up $1 from the levels recently quoted. No other price changes were reported.

• **Houston**—The price on foundry scrap 2 ft in length went up $1 to $40-$41 last week, reflecting increased demand. Export trade continued strong, and some new orders placed by a Texas mill gave the domestic market a little nudge.

• **Seattle**—The market advanced $1 to $3 a ton last week. Renewed mill buying and export activity are the underlying reasons for the rise. No. 1 heavy melting is now quoted $41, No. 2 at $38, and No. 2 bundles $23-$24. Other items are quoted similarly higher.

Exporters are stockpiling at Portland and Seattle. Some of the tonnage is for shipment to Japan, full cargoes being planned for late March. Exporters are buying in volume, and supplies are not too large. However, better weather is stimulating collections.

• **Los Angeles**—With the domestic scrap market virtually dormant, export prices have jumped 25 to 45 per cent. Offshore buying, mostly from Japan, is up, and since cargoes ordered exceed supplies, the market is unsettled.

• **San Francisco** — Pressures are building up for an upward revision in steel scrap prices, but so far there have been no changes. One of the large area mills says it won't be in the market for scrap this month.

Finished Steel Shipments—December, 1960

(All grades; net tons)

Products	Carbon	Alloy	Stainless	Total for Year 1960	1959
Ingots, etc.	8,768	7,282	1,482	337,642	334,918
Blooms, slabs, etc.	69,270	24,946	1,217	1,418,481	1,498,620
Tube rounds	225	122	.....	16,705	14,669
Skelp	14,459	.....	.....	130,204	41,209
Wire rods	49,404	1,334	670	918,195	980,266
Structurals	294,911	3,574	27	4,835,832	4,090,535
Steel piling	21,550	91	.....	422,860	340,669
Plates	345,260	29,338	3,447	6,131,587	5,819,156
Rails—standard	20,561	.....	.....	667,912	590,039
Rails—other	2,024	.....	.....	46,698	42,058
Joint bars	1,253	.....	.....	26,902	31,374
Tie plates	2,918	.....	.....	124,264	143,262
Track spikes	1,452	.....	.....	44,804	52,389
Wheels	11,910	45	.....	243,310	232,749
Axles	5,251	93	.....	111,784	97,102
Hot rolled bars	308,778	80,437	3,213	6,915,435	6,936,291
Reinforcing bars	148,382	.....	.....	2,214,498	2,173,462
Cold finished bars	58,161	12,857	3,585	1,385,333	1,408,811
Tool steel	531	5,166	.....	86,784	96,069
Standard pipe	116,510	93	.....	2,131,697	2,210,524
Oil country goods	70,528	18,865	.....	1,197,134	2,066,661
Line pipe	140,977	3	.....	2,689,759	2,802,537
Mechanical tubing	28,896	13,126	366	762,582	970,344
Pressure tubing	13,962	2,542	1,082	271,252	260,616
Drawn wire	153,740	2,435	1,505	2,439,931	2,725,598
Nails & staples	15,522	.....	1	320,402	391,694
Barbed wire	2,793	.....	.....	47,851	48,745
Woven fence	4,595	.....	.....	103,877	141,514
Bale ties, etc.	1,849	.....	.....	62,707	55,542
Black plate	31,780	.....	.....	576,198	562,147
Tin plate—HD	16,394	.....	.....	389,986	412,123
Tin plate—electro	239,978	.....	.....	5,075,502	4,858,511
Sheets—hot rolled	435,259	12,337	2,055	7,990,748	7,844,519
Sheets—cold rolled	851,715	2,886	11,076	14,466,261	12,751,072
Sheets—galvanized	165,630	.....	.....	3,056,996	2,772,835
Sheets—other coated	13,923	.....	.....	261,203	280,336
Elec. sheets—strip	2,464	33,264	.....	567,820	632,310
Hot rolled strip	82,625	1,000	896	1,332,280	1,272,691
Cold rolled strip	66,737	953	11,691	1,325,802	1,393,100
Total (1960)	3,820,945	252,789	42,313	71,149,218	.....
Total (1959)	7,585,670	548,261	77,116	.....	69,377,067

Data from American Iron & Steel Institute.

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, Mar. 8, 1961. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 8	$36.67
Mar. 1	35.67
Feb. Avg.	33.74
Mar. 1960	34.00
Mar. 1956	50.21

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	30.00-31.00
No. 1 dealer bundles	34.00-35.00
No. 2 bundles	28.00-29.00
No. 1 busheling	34.00-35.00
No. 1 factory bundles	44.00-45.00
Machine shop turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Short turnings	20.00-21.00
Cast iron borings	19.00-20.00
Cut structurals:	
2 ft and under	36.00-37.00
3 ft and under	35.00-36.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	40.00-41.00
Electric furnace bundles	40.00-45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	*37.00-38.00*
Stove plate	*37.00-38.00*
Unstripped motor blocks	*29.00-30.00*
Clean auto cast	*34.00-35.00*
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	35.00-36.00
Rails, 2 ft and under	48.00-49.00
Rails, 18 in. and under	49.00-50.00
Random rails	44.00-45.00
Angles, splice bars	40.00-41.00
Railroad specialties	44.00-45.00
Rails, rerolling	53.00-54.00

Stainless Steel Scrap

18-8 bundles & solids	180.00-185.00
18-8 turnings	105.00-110.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*37.00-38.00*
No. 1 hvy melt., dealer	*35.00-36.00*
No. 2 hvy melting	*30.00-31.00*
No. 1 factory bundles	40.00-41.00
No. 1 dealer bundles	*36.00-37.00*
No. 2 bundles	*22.00-23.00*
No. 1 busheling, indus.	*37.00-38.00*
No. 1 busheling, dealer	*35.00-36.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	17.00-18.00
Shovel turnings	17.00-18.00
Cast iron borings	17.00-18.00
Cut structurals, 3 ft	*40.00-41.00*
Punchings & plate scrap	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	42.00-43.00
Stove plate	38.00-39.00
Unstripped motor blocks	34.00-35.00
Clean auto cast	47.00-48.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	*39.00-40.00*
R.R. malleable	*45.00-46.00*
Rails, 2 ft and under	*50.00-51.00*
Rails, 18 in. and under	*51.00-52.00*
Angles, splice bars	42.00-43.00
Axles	*57.00-58.00*
Rails, rerolling	*57.00-58.00*

Stainless Steel Scrap

18-8 bundles, solids	*175.00-180.00*
18-8 turnings	*100.00-105.00*
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.00-27.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	29.00-30.00
No. 2 bundles	19.00-20.00
No. 1 busheling	26.00-27.00
Machine shop turnings	10.00-11.00
Mixed borings, turnings	11.00-12.00
Shovel turnings	12.00-13.00

Cast Iron Grades

No. 1 cupola	31.00-32.00
Stove plate	25.00-26.00
Heavy breakable	24.00-25.00
Unstripped motor blocks	21.00-22.00
Charging box cast	26.00-27.00
Clean auto cast	37.00-38.00

CLEVELAND

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	21.00-22.00
No. 1 factory bundles	40.00-41.00
No. 1 bundles	34.00-35.00
No. 2 bundles	19.00-20.00
No. 1 busheling	34.00-35.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	33.00-34.00
Cut structurals, plate, 2 ft and under	40.00-41.00
Low phos. punchings & plate	35.00-36.00
Alloy free, short shovel turnings	18.00-19.00
Electric furnace bundles	36.00-37.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Charging box cast	26.00-27.00
Heavy breakable cast	28.00-29.00
Stove plate	36.00-37.00
Unstripped motor blocks	31.00-32.00
Brake shoes	37.00-38.00
Clean auto cast	45.00-46.00
Burnt cast	32.00-33.00
Drop broken machinery	46.00-47.00

Railroad Scrap

R.R. malleable	45.00-46.00
Rails, 2 ft and under	52.00-53.00
Rails, 18 in. and under	52.00-53.00
Rails, random lengths	44.00-45.00
Cast steel	42.00-43.00
No. 1 railroad cast	48.00-49.00
Railroad specialties	*47.50-48.50*
Angles, splice bars	43.50-44.50
Rails, rerolling	56.00-57.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	155.00-160.00
18-8 turnings	70.00-75.00
430 clips, bundles, solids	70.00-75.00
430 turnings	15.00-25.00

YOUNGSTOWN

No. 1 heavy melting	36.00-37.00
No. 2 heavy melting	24.00-25.00
No. 1 busheling	37.00-38.00
No. 1 bundles	37.00-38.00
No. 2 bundles	22.00-23.00
Machine shop turnings	14.00-15.00
Shovel turnings	19.00-20.00
Cast iron borings	19.00-20.00
Low phos.	39.00-40.00
Electric furnace bundles	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	*40.00-41.00*

BUFFALO

No. 1 heavy melting	*29.00-30.00*
No. 2 heavy melting	23.00-24.00
No. 1 bundles	*29.00-30.00*
No. 2 bundles	20.00-21.00
No. 1 busheling	*29.00-30.00*
Shovel turnings	16.00-17.00
Machine shop turnings	12.00-13.00
Cast iron borings	14.00-15.00
Low phos. structurals and plates, 2 ft and under	*39.00-40.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	36.00-37.00
No. 1 machinery	43.00-44.00

Railroad Scrap

Rails, random lengths	*42.00-43.00*
Rails, 3 ft and under	*48.00-49.00*
Rails, rerolling	56.50-57.50
Railroad specialties	*41.00-42.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*27.50-28.50*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	21.00-22.00
No. 1 busheling	*30.00-31.00*
Machine shop turnings	*11.00-12.00*
Mixed borings, turnings	*12.00-13.00*
Shovel turnings	*13.00-14.00*
Cast iron borings	11.00-12.00
Low phos. 18 in.	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable cast	28.00-29.00
Charging box cast	35.00-36.00
Drop broken machinery	46.00-47.00

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00-33.00*
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	38.00-39.00

PHILADELPHIA

No. 1 heavy melting	39.00
No. 2 heavy melting	36.00
No. 1 bundles	41.00
No. 2 bundles	26.00
No. 1 busheling	41.00
Electric furnace bundles	42.00
Mixed borings, turnings	15.00
Shovel turnings	21.00
Machine shop turnings	14.00
Heavy turnings	25.00†
Structurals & plates	*41.00-44.00*
Couplers, springs, wheels	44.00-45.00
Rail crops, 2 ft & under	50.00-52.00

Cast Iron Grades

No. 1 cupola	*39.00*
Heavy breakable cast	39.00
Drop broken machinery	49.00-50.00
Malleable	46.00†

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	28.00-29.00
No. 2 heavy melting	*21.00-22.00*
No. 1 bundles	28.00-29.00
No. 2 bundles	17.00-18.00
Machine shop turnings	3.50-4.00†
Mixed borings, turnings	4.00-4.50†
Shovel turnings	5.00-6.00†
Low phos. structurals & plates	31.00-32.00†

Cast Iron Grades

No. 1 cupola	34.00-35.00
Unstripped motor blocks	23.00-24.00
Heavy breakable	28.00-29.00

Stainless Steel

18-8 sheets, clips, solids	155.00-160.00
18-8 borings, turnings	70.00-75.00
410 sheets, clips, solids	40.00-45.00
430 sheets, clips, solids	55.00-60.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	23.00-24.00
No. 2 heavy melting	19.00-20.00
No. 1 bundles	23.00-24.00
No. 1 busheling	23.00-24.00
Machine shop turnings	5.00-6.00
Shovel turnings	9.00-9.50
No. 1 cast	39.00-40.00
Mixed cupola cast	30.00-30.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	32.00-33.00
No. 2 heavy melting	22.00-23.00
No. 1 bundles	32.00-33.00
No. 2 bundles	20.00-21.00
No. 1 busheling	32.00-33.00
Cast iron borings	10.00-11.00
Machine shop turnings	15.00-16.00
Shovel turnings	18.00-19.00
Bar crops and plates	37.00-38.00
Structurals & plate	36.00-37.00
Electric furnace bundles	34.00-35.00
Electric furnace:	
3 ft and under	34.00-35.00
2 ft and under	35.00-36.00

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Stove plate	*45.00-46.00*
Unstripped motor blocks	32.00-33.00
No. 1 wheels	34.00-35.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-33.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	37.00-38.00
Angles, splice bars	37.00-38.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*35.00*
No. 2 heavy melting	*29.00*
No. 1 bundles	*35.00*
No. 2 bundles	*26.00*
No. 1 busheling	*34.00*
Machine shop turnings	*13.00*
Shovel turnings	*16.00*

Cast Iron Grades

No. 1 cupola	40.00
Charging box cast	33.00
Heavy breakable cast	31.00
Unstripped motor blocks	33.00
Clean auto cast	41.00
Stove plate	35.00

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00*
Rails, random lengths	37.00†
Rails, rerolling	*51.00*
Rails, 18 in. and under	*43.00*
Angles, splice bars	40.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	35.00-36.00†
No. 2 heavy melting	31.00
No. 1 bundles	35.00-36.00
No. 2 bundles	21.00-22.00
Machine shop turnings	7.00-8.00†
Low phos. plate & structurals:	
3 ft	36.00-37.00
2 ft and under	*40.00-41.00*

Cast Iron Grades

No. 1 cupola	36.00-37.00
Heavy breakable	24.00
Foundry malleable	29.00-30.00†
Unstripped motor blocks	30.00-31.00

Railroad Scrap

R.R. heavy melt. (3 ft)	36.00-37.00

LOS ANGELES

No. 1 heavy melting	30.00
No. 1 hvy melt (export)	34.00*
No. 2 heavy melting	27.00
No. 2 hvy melt (export)	30.00*
No. 1 bundles	25.00
No. 2 bundles	17.00
No. 2 bundles (export)	22.00*
Machine shop turnings	12.00
Shovel turnings	13.00
Cast iron borings	13.00
Cut structurals and plate 1 ft and under	40.00

Cast Iron Grades

No. 1 cupola	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-36.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	*41.00*
No. 2 heavy melting	*38.00*
No. 2 bundles	*23.00-24.00*
Shovel turnings	13.00
Electric furnace bundles	45.00-47.00

Cast Iron Grades

No. 1 cupola	*44.00*
Heavy breakable	*39.00*
Unstripped motor blocks	*36.00*
Stove plate (f.o.b. plant)	*39.00*

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	*41.00*
No. 1 hvy (unprepared)	*38.00*
No. 2 heavy melting	*38.00*
No. 2 hvy (unprepared)	*35.00*
No. 2 bundles	*23.00-24.00*
Shovel turnings	15.00
Electric furnace bundles	*47.00*

Cast Iron Grades

No. 1 cupola	*42.00*
Heavy breakable cast	*39.00*
Unstripped motor blocks	*36.00*
Stove plate (f.o.b. plant)	*39.00*

SAN FRANCISCO

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00-28.00
No. 2 bundles	18.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	46.00-48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	45.00-46.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	28.00
No. 2 hvy melt, 2 ft & under	27.00
No. 1 bundles	28.00
No. 2 bundles	17.50
Mixed steel scrap	20.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	28.00
Unprepared	22.00
Shovel turnings	12.00

Cast Iron Grades‡

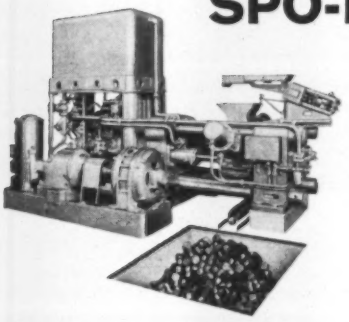
No. 1 machinery cast	32.00

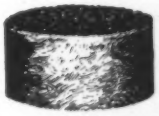
*For export add $4 dock charge.
†Nominal.
‡F.o.b. Hamilton, Ont.
§Delivered.

"Briquette this stuff and we can sell it at a profit!"

. . . with a

SPO-MILWAUKEE briquetting press!

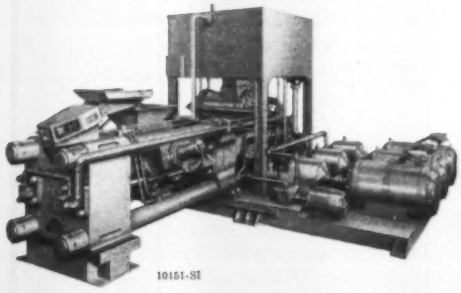




As the metal working industry increases machine tool speeds . . . as automation techniques facilitate faster production . . . more and MORE chips, turnings and borings are formed.

Briquetted scrap sells for more money . . . and this means a briquetting press is a profit making machine . . . a profit unit that operates virtually "operator-free." The advantages of briquetting go even beyond profit. Your scrap will require less storage area. Briquetted scrap is easier to handle . . . cheaper to ship . . . faster to dispose of.

If your machine tool scrap ranges from 4 tons per day to 9 tons per hour, there is a Milwaukee briquetting press that will bring profit to your scrap problem.



10151-SI

We strongly urge you to write today for Bulletin BP-217. It will provide you with all the facts. Send your inquiry to . . .

WORLD'S LARGEST SUPPLIERS SPO OF MOLDING MACHINES

MILWAUKEE *Foundry Equipment Division*

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Aluminum Sales Begin to Move Up

Nonferrous Metal Prices, Pages 184 & 185

ALUMINUM SALES are on the upgrade.

Whether that signals a genuine turn for the better or merely a seasonal pickup is a topic aluminum men shy away from. They haven't forgotten overly optimistic forecasts for 1960 that fell flat.

The cautious consensus is that a recovery has started. The pattern is spotty. But it appears that aluminum's recession may have bottomed out in January. Since then, there has been a small and gradual rise in shipments, and, more significantly, in new orders.

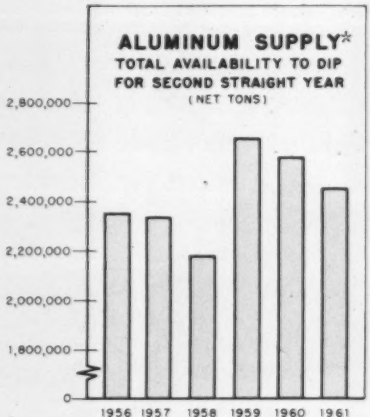
The strongest business improvement is reported by some of the independent distributors and fabricators. One company says February sales set an all-time monthly high.

• **Significance** — The industry has traditionally been a bellwether of metalworking sales. When a recession comes, aluminum companies are among the first to feel it; ditto for an upturn.

The building products industry is the most active buyer of aluminum today. Sales to the transportation industry have also risen. And stepped up ordering is reported from makers of air conditioners and baseboard heating units.

Most of the purchases are for current consumption. Some inventory buying is going on, mostly where a company has pruned stocks below a "safe" working level for present business.

• **'61 Outlook**—Aluminum men are reluctant to make public forecasts because of the uncertainties in the economy. In private, many feel it would only take a modest upswing in business activity to pull sales to last year's level, or perhaps even higher. They point out: While shipments in 1960 fell 6 per cent to 2,330,000 tons (from the record 2,500,000 tons set in 1959), this doesn't reflect consumption. In fact, many observers believe there was so much customer workoff of stocks last year that a new consumption record may have been set. In 1961, shipments and consumption will be more in balance.



*Includes U.S. primary and secondary production, primary imports, and recovery from imported scrap.

Source: Business & Defense Services Administration.

Last year, shipments of mill products to consumers fell 10 per cent to 1.5 million tons. But ingot shipments (for uses other than conversion to mill products) leaped to 800,000 tons, reports the Business & Defense Services Administration. Mainly responsible: Exports of 285,000 tons, up 135 per cent from 1959's. (Exports of semifabricated shapes gained 43 per cent.) The outlook: Export sales will be good, but not as good as in 1960.

• **Less Metal**—After racking up record production of 2,014,000 tons in 1960, the primary industry will ease off this year and turn out about 1,870,000 tons, says BDSA. Also forecast by BDSA's Aluminum & Magnesium Division: Primary imports of 155,000 tons, almost identical with those of last year; secondary recovery of 420,000 tons, up slightly from the 407,000 tons registered in 1960; and recovery from imported scrap of 5000 tons vs. 4500 tons last year. That puts total domestic availability at 2,450,000 tons compared with 2,580,000 tons in 1960 (see chart).

• **Price Prospects** — Price fighting doesn't appear to have eased any. One source notices less "gimmicking" of ingot prices but reports a considerable amount of metal is still moving at less than the official quotation of 26 cents a pound.

Prices should strengthen as the year goes on and business improves. In August, producers will be hit with a wage increase under terms of a contract signed in 1959. At that time, there will be pressures for a price increase in ingots and mill products, or both. It's possible

(*Please turn to Page* 185)

NONFERROUS PRICE RECORD

	Mar. 8 Price	Last Change	Previous Price	Feb. Avg	Jan. Avg	Mar., 1960 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	26.000
Copper	29.00	Jan. 17, 1961	29.00–30.00	29.000	29.340	33.296
Lead	10.80	Dec. 13, 1960	11.80	10.800	10.800	11.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	103.00	Mar. 8, 1961	102.75	101.181	100.540	100.227
Zinc	11.50	Jan. 9, 1961	12.000	11.500	11.600	13.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, East St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingot, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

AGAIN-

Shown here is the 6"

Rapidaytor

Dolphin Submersible Pump, one of a complete line of 4" and 6" pumps made by THE TAIT MANUFACTURING COMPANY, Dayton, Ohio. Arrow points to the upper body shell made of Revere seamless leaded brass tubing. Hand holds the diffuser casing made of Revere Brass Strip and used inside pump.

Revere helps "fit the metal to the job"

AND A PUMP MANUFACTURER FABRICATES SUPERIOR PARTS WITH GREATER EASE . . . INCREASES TOOL LIFE

An important part of the submersible pumps made by Tait Manufacturing Company is the brass diffuser casing you see above. This part had formerly been made of ferrous metal. While satisfactory as a pump part it was difficult to work and draw . . . at the same time tool life was short.

One of Revere's Technical Advisors was asked to study the problem. Revere Cartridge Brass Strip of a certain temper was recommended, samples submitted, and, after extensive tests, was approved. The customer has found that not only does the diffuser casing, made of Revere Brass, perform well in the pump, but it also has superior drawing properties, is more easily worked, and tool life has been substantially increased.

This meticulous attention to "fitting the metal to the job" also resulted in Tait Manufacturing Company's specifying Revere seamless leaded brass tubing for the upper body shell of its submersible pumps. Here the application called for extremely close straightness and roundness control which meant special attention to detail on the part of the Revere mills.

Why not put the extensive knowledge of Revere's T.A. Service to work for you? With the wide variety of metals at your disposal, perhaps Revere can help you select the one best suited for the job, with a resultant saving of money while improving product quality.

COPPER • BRASS 1801 REVERE ALUMINUM

REVERE COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices; 230 Park Avenue, New York 17, N. Y.

Sales Offices in Principal Cities. Mills: Rome, N. Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford and Plymouth, Mass.; Brooklyn, N. Y.; Newport, Ark.; Ft. Calhoun, Neb.

Distributors Everywhere

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, 50 lb ingots, 26.00, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 27.60; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $70.00 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.60 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg; $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55 per lb and up nom.

Copper: Electrolytic, 29.00 deld.; custom smelters, 29.00; lake, 29.00 deld.; fire refined, 28.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 10.80; chemical, 10.90; corroding, 10.90; St. Louis. New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb deld.; 24-90 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, N. York, $206-208 per 76 lb flask.

Molybdenum: Unalloyed forging billets, 4.12-8.5 in. diam., 50-4999 lb, $8.15 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, briquettes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01; Exton, Pa., basis, add 1.60. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l. 20.00; 5 and 12 lb bricks, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Melting stock, $35 per lb; rod $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50-5 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot, 103.00; prompt, 102.875.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 100-lb lots, $2.75-2.85 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00c; 99+% hydrogen reduced, $3.10-4.00.

Zinc: Prime western, 11.50; brass special, 11.75; intermediate, 12.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.85; special high grade, 13.00 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 14. 75; No. 5, 14.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8-8.50 per lb; 100-500 lb, $7.25-7.50 per lb; 500-1000 lb, $6.50-7.25; over 1000 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 25.00-26.00; No. 12 foundry alloy (No. 2 grade), 22.75; 5% silicon alloy, 0.60 Cu max., 24.00; 13 alloy, 0.60 Cu max., 24.00; 195 alloy, 25.75; 108 alloy, 23.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.50; grade 4, 21.00.

Brass Ingot: Red brass, No. 115, 27.25-28.25; tin bronze, No. 225, 37.00-38.00; No. 245, 31.50-32.50; high leaded tin bronze, No. 305, 31.75-32.75; No. 1 yellow, No. 405, 22.75-24.75; manganese bronze, No. 421, 26.50-27.50.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.935, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.935, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 34.355; l.c.l., 34.98. Weatherproof, 20,000-lb lots, 35.55; l.c.l., 36.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $16.50 per cwt; pipe, full coils, $16.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $14.00-22.90; C.R. strip, $16.00-35.00; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	128
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.40-48.00
0.136-0.096	24-72	72-180	45.90-48.80
0.096-0.077	24-72	72-180	46.40-50.30
0.077-0.068	24-72	72-180	46.90-52.10
0.068-0.061	24-72	72-180	46.90-55.00
0.061-0.048	24-72	72-180	47.40-57.70
0.048-0.038	24-72	72-180	47.90-60.50
0.038-0.030	24-72	72-180	48.40-65.30
0.030-0.024	24-72	72-180	48.90-67.20
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-46	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; length, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100, 3003-F	44.60	50.90
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4*	51.80	58.90
7075-T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 base, 12 ft lengths.

Diam	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	74.90	77.30	....	....
0.188	63.20	63.20	....	80.10
0.250	60.00	62.60	72.70	74.10
0.375	59.20	63.80	71.00	72.00
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	59.20	63.80	71.00	72.00
0.625	59.20	63.80	67.80	67.90
0.750	57.70	62.00	61.60	63.80
0.875	57.70	62.00	61.60	63.80
1.000	57.70	62.00	61.60	63.80
1.125	55.30	59.50	59.50	61.50
1.250	55.30	59.50	59.50	61.50
1.375	55.30	59.50	59.50	61.50
1.500	55.30	59.50	59.50	61.50
1.625	53.00	56.70	....	59.30
1.750	53.00	56.70	58.30	59.30
1.875	53.00	56.70	....	59.30
2.000	53.00	56.70	58.30	59.30
2.250	51.50	55.00	....	59.30
2.500	51.50	55.00	....	59.30
2.750	49.90	53.20	....	59.30
3.000	49.00	53.20	....	59.30
3.250	....	53.20	....	....
3.375	....	53.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random length, diam., 0.375-8 in., "F" temper; 2014, 47.50-57.60; 6061, 43.50-57.60; 7075, 61.80-71.90; 7079, 66.80-76.90.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 32.00; 1¼ in., 43.40; 1½ in., 51.80; 2 in., 62.60; 3 in., 124.95; 4 in., 171.80; 5 in., 233.15; 6 in., 308.55; 8 in., 464.35; 10 in., 716.25 (3-24 ft lengths).

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	45.30-46.80	54.00-60.00
15-17	45.30-46.80	56.50-61.80
18-23	45.80-47.50	58.60-67.60
24-32	45.80-47.50	66.80-81.50
33-38	49.50-52.20	85.10-96.60
39-44	59.80-63.60	102.00-124.00

MAGNESIUM

Sheets and Plates: AZ31B standard grades, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grades (AZ31B)
6-8	65.30-67.60	84.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 22.00-22.50; No. 2 heavy copper and wire, 20.75-21.25; light copper, 18.25-18.75; No. 1 composition red brass, 18.50-19.00; No. 1

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES e (Based on copper at 29.00c)		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	55.32	25.000	25.000	24.250
Yellow Brass	48.10	33.71d	48.39	52.26	19.250	18.375	17.375
Low Brass, 80%	50.65	50.39	50.94	54.71	21.375	21.125	20.625
Red Brass, 85%	51.54	51.48	51.83	55.60	22.250	22.000	21.500
Com. Bronze, 90%	52.98	52.92	53.27	56.79	23.000	22.750	22.250
Manganese Bronze	56.56-56.59	50.22-50.24	60.47	....	18.000	17.750	17.250
Muntz Metal	50.94	46.25	....	....	18.125	17.875	17.375
Naval Brass	52.86	46.67	59.17	57.02	18.000	17.750	17.250
Silicon Bronze	59.49	58.68	58.78	77.90	24.500	24.250	23.500
Nickel Silver, 10%	63.66	65.99	65.74	....	24.125	23.875	12.062
Phos. Bronze, A-5%	74.59	75.09	74.34	76.52	26.125	25.875	24.875

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time of any or all kinds of scrap, add 1 cent per lb.

composition turnings, 17.50-18.00; new brass clippings, 15.75-16.25; light brass, 12.75-13.25; heavy yellow brass, 13.75-14.25; new brass rod ends, 14.75-15.25; auto radiators, unsweated, 14.00-14.50; cocks and faucets, 15.50-16.00; brass pipe, 16.00-16.50.

Lead: Soft scrap lead, 7.00-7.50; battery plates, 3.00-3.25; linotype and stereotype, 8.00-8.25; electrotype, 7.50-7.75; mixed babbitt, 9.00-9.50.

Monel: Clippings, 23.00-23.50; old sheets, 22.00-23.00; turnings, 16.50-17.00; rods, 20.00-21.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 2.75-3.00; new diecast scrap, 2.75-3.00; old diecast scrap, 1.00-1.25.

Aluminum: Old castings and sheets, 9.00-9.50; clean borings and turnings, 4.50-5.00; segregated low copper clips, 11.00-11.50; segregated high copper clips, 10.00-10.50; mixed low copper clips, 10.50-11.00; mixed high copper clips, 10.00-10.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 7.00-7.50; segregated low copper clips, 15.00-15.50; segregated high copper clips, 13.50-14.00; mixed low copper clips, 12.50-13.00; mixed high copper clips, 12.00-12.50.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 8.50-9.00; segregated low copper clips, 14.00; segregated high copper clips, 13.00; mixed low copper clips, 13.00; mixed high copper clips, 12.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)
Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 55.00; light scrap, 50.00; turnings and borings, 35.00.
Copper and Brass: No. 1 heavy copper and wire, 25.00; No. 2 heavy copper and wire, 23.50; light copper, 21.25; refinery brass (60% copper) dry copper content, 22.25.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 25.00; No. 2 heavy copper and wire, 23.50; light copper, 20.75; No. 1 composition borings, 20.00-21.50; No. 1 composition solids, 21.00-22.00; heavy yellow brass solids, 16.00-17.00; yellow brass turnings, 14.00-16.00; radiators, 16.75-17.25.

Plating Material

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.60.
Copper: Flat-rolled, 46.04; oval, 42.50; electrodeposited, 38.00; cast, 40.50; 5000-10,000 lb quantities.
Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.
Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.
Zinc: Balls, 18.75; flat tops, 18.75; flats 21.50; ovals, 20.75, ton lots.

CHEMICALS

Cadmium Oxide: $1.60 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.
Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.
Copper Sulphate: 100-1900 lb, 15.00; 2000-5900 lb, 13.00; 6000-11,900 lb, 12.75; 12,000-22,900 lb, 12.50; 23,000 lb or more, 12.00.
Nickel-Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 500-9900 lb, 38.00; 10,000 lb or more, 37.00.
Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.
Sodium Cyanide (Cyanobrik): 2000 lb, 23.80; 400-900 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.
Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.
Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.
Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.
Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page* 182)

that some of the commodity price schedules might be raised before then.

More Cuts in Zinc

Three more zinc producers have announced operational cutbacks because of oversupply of the metal on the U. S. market. American Smelting & Refining Co. is trimming output at its Corpus Christi, Tex., refinery by 11 per cent. New Jersey Zinc Co. is curtailing production of slab zinc and Zamak alloys by 15 per cent at its Palmerton, Pa., Works; and Matthiesen & Hegeler Zinc Co. Inc., is cutting back 20 per cent at its Meadowbrook, W. Va., facilities.

Significantly, most of the cutbacks are in special high grade zinc. The diecasting material has been in weak demand because of slack buying from Detroit.

Sales have improved for prime western zinc, thanks to stepped up demand from galvanizers.

In the Markets

• **Lead Sales Up**—Lead sales are up, partly because of seasonal reasons and partly because of generally better demand. It's still too early to tell if this is anything more than a temporary improvement.

• **Mercury Drops** — The mercury price continues to weaken. Reports are widespread that some deals are being made at $203 to $205 a flask. Behind the weakness: A continuation of poor sales, plus large stocks in the hands of some producers.

• **Magnesium Castings Down**—Shipments of magnesium castings last year fell 14 per cent to 11,773 tons. But diecasting shipments bucked the trend and rose 16 per cent to 3800 tons, reports the Magnesium Association.

Structural Shapes . . .

Structural Shape Prices, Page 167

Construction is providing one bright spot in the business outlook. In the Midwest, heavy building is up noticeably, and general construction is beginning to move up. In the East, more public building is coming on the market and more miscellaneous construction is developing.

Fabricators have extended their order backlogs somewhat, but they are still competing sharply for new work.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

1584 tons, Randhurst Shopping Center, Mt. Prospect, Ill., to Mississippi Valley Structural Steel Co., Chicago; George A. Fuller Co. and Turner Construction Co. are joint contractors. Also placed, 368 tons of steel joists.

283 tons, bridge, Southwest Expressway, Route 94, Sec. 2020, 57th St. and Wentworth Ave., for the State of Illinois, to Vierling Steel Works, Chicago.

275 tons, pharmaceutical plant, William H. Rorer Inc., Ft. Washington, Pa., to Bethlehem Fabricators, Bethlehem, Pa.

268 tons, state highway bridge, Somerset County, New Jersey, through Coopersmith Bros., general contractor, to American Bridge Div., U. S. Steel Corp., Pittsburgh.

265 tons, RCA Laboratory, Princeton, N. J., through Matthews Construction Co., to Belmont Iron Works, Eddystone, Pa.

100 tons or more, cell block, Walla Walla penitentiary, to Stewart Iron Works, Covington, Ky.

100 tons, trashracks for Albeni Falls Dam, Columbia River, to Union Iron Works, Spokane, Wash., low at $20,140, by U. S. Engineer, Seattle.

STRUCTURAL STEEL PENDING

12,000 tons, Minuteman missile project, Montana, general contract let.

1639 tons, Yellowtail Dam and powerhouse, Big Horn River, Montana; bids to the Bureau of Reclamation, Hardin, Mont., Apr. 11.

288 tons, steel sheet piling, delivery Kewaunee,

CLASSIFIED

For Sale

STEEL FOUNDRY FOR SALE

Cleveland. Capacity 40 tons of jobbing and semi production castings per week. Two electromelt furnaces, one 1000# capacity, one 500# capacity. Laboratory, pattern shop, and machine shop. All equipment complete and ready to go. $39,000.00. Lease available to responsible party. Telephone VI 1-2900, Detroit, Michigan.

Help Wanted

PROGRESSIVE STEEL MILL desires services of established Salesman familiar with High Carbon Strip and Round Wire Specialties for Atlantic Seaboard. Box No. 907, STEEL, Penton Bldg., Cleveland 13, Ohio.

Accounts Wanted

ACCOUNT WANTED
Have been calling on wholesale hardware, industrial supply and manufacturing concerns for twelve years in Ohio and neighboring areas. Would like additional account in whole or part of this territory, preferably northern Ohio. Have had mill experience in cold finished steel, some knowledge of nonferrous metals. Reply Box 913, STEEL, Penton Bldg., Cleveland 13, Ohio.

Representatives Wanted

TOOL ACCESSORY MANUFACTURER REQUIRES energetic representation in many areas. Must be familiar with machine tool distributors. Write Box 904; STEEL, Penton Bldg., Cleveland 13, Ohio.

$8.00 MORE PER TON FROM TURNINGS

American Rolling Ring Metal Turnings Crushers quickly pay for themselves. Savings of approximately $4.00 per ton through extra cutting-oil recovery from crushed turnings often pay for the crusher in a short time. In addition, uniform chips command a higher price (up to $4 more per ton). Add to this the valuable savings in storage space (up to 75% less), the easier handling, the heavier car loadings possible, and you have tremendous profit advantages with the American Crusher working in your plant.

If your turnings amount to 20 tons or more a month, there's an American Crusher designed to pay off big for you.

American has manufactured Turnings Crushers since 1917 and makes a wide range of models with capacities from 1 ton to 50 tph.

Write for Bulletin #159.

American PULVERIZER COMPANY
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS
1539 MACKLIND AVE. ST. LOUIS 10, MISSOURI 6103

Wis.; bids to U. S. Engineer, Chicago.

181 tons, state bridge, Bergen County, New Jersey; Sam Braen Sons, low on the general contract.

160 tons, additions, substations, Missouri River Basin project, Hinton, Iowa, and Grand Forks, N. Dak.; bids Mar. 23, Bureau of Reclamation, Denver; also 58 tons, transmission line approach towers.

145 tons, New York State bridgework, RC 61-16, FASS 61-1, Suffolk County, New York; bids closed Feb. 23.

143 tons, two, 3 span composite wide flange beam bridges, Williston, Vt.; bids Mar. 31, Montpelier; also, 65 tons of concrete reinforcing bars.

100 tons or more, steel caisson drydock No. 3, Naval shipyard, Portsmouth, N. H.; bids Apr. 4, Public Works Office, First Naval District, Boston.

100 tons, improvements, grade separation at New York Avenue, Washington; bids in to the District Department of Highways.

100 tons, radar tower, Othello, Wash.; Northern Pacific Corp., Yardley, Wash., low at $196,799 to the U. S. Engineer, Seattle.

100 tons or more, radio tower, Ft. Lawton, Seattle; E. F. Schuck Construction Co., Seattle, low at $215,000 to the U. S. Engineer, Seattle.

100 tons, radar tower, Blaine, Wash.; bids to the U. S. Engineer, Seattle, Apr. 5.

REINFORCING BARS . . .

REINFORCING BARS PLACED

522 tons, Wooster Square School and Community Center, New Haven, Conn., to United States Steel Supply Div., U. S. Steel Corp., Pittsburgh; W. J. Megin Inc., Naugatuck, Conn., general contractor.

520 tons, 6 miles of 20 and 24 in. concrete cylinder water supply line for Port Angeles, Wash., to United Concrete Pipe Corp., Auburn, Wash.; Harbert Construction Co., Tacoma, Wash., is general contractor.

133 tons, west waterway pier construction, Port of Seattle, to Soule Steel Co., Seattle; General Construction Co., Seattle, general contractor.

108 tons, west waterway pier construction, Port of Seattle, to Pacific Coast Div., Bethlehem Steel Co., Seattle; General Construction Co., Seattle, is general contractor.

REINFORCING BARS PENDING

20,000 tons, Minuteman missile project, Malmstrom Air Base, Montana; general contract to George A. Fuller Co. and Dell E. Webb Co., Los Angeles, at $61,773,644.

3740 tons, Yellowtail Dam, Montana; bids to the Bureau of Reclamation, Hardin, Mont., Apr. 11.

100 tons or more, 144 man dormitory, University of Alaska, College, Alaska; Hebb & Narodick Inc., Seattle, low at $637,681.

100 tons or more, four road bridges, 346 ft total length, Fergus County, Montana; W. P. Roscoe, Billings, Mont., low at $196,829.

100 tons or more, addition to women's dormitory, University of Portland; bids Mar. 1.

100 tons, Schaake Co., meat packing plant, Seattle; Ray Solie, Seattle, low at $154,321.

100 tons or more, one-story motel and garage, at 113 Aurora Ave., Seattle; Henry George & Sons, Spokane, Wash., general contractor.

PLATES . . .

PLATES PENDING

500 tons or more, 200,000 barrel tank addition to Kenai Pipeline Co. terminal, Nikiska, Alaska; plans being prepared.

107 tons, including 10 tons of angles and channels; bids to the U. S. Engineer, Kansas City, Mo.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Delaware & Hudson, six, 1800 hp diesel-electric locomotives to Alco Products Inc., Schenectady, N. Y.

Boston & Maine, six, 1800 hp road switchers, to Electro-Motive Div., General Motors Corp., La Grange, Ill.

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for the best braze in the business... it's the

NEW AIRCOSIL FLUXCOR

Airco's new silver alloy wire, AIRCOSIL FLUXCOR, is the only wire available which has the flux incorporated within the core of the filler metal wire. It reduces or eliminates the time normally needed for separate fluxing of parts. It minimizes flux inclusions. It gives exactly the right amount of flux every time for a good strong joint — no more weak joints because of poor fluxing — no more wasted fluxing.

In addition, Aircosil Fluxcor minimizes the danger of voids resulting from improper pre-cleaning. It can be used readily by operators who have very little brazing experience. Aircosil Fluxcor has an alloy content which is equivalent to a 3/64″ diameter solid brazing wire.

For immediate delivery and complete information phone your nearby Airco office or local distributor.

AIRCO® **AIR REDUCTION SALES COMPANY**

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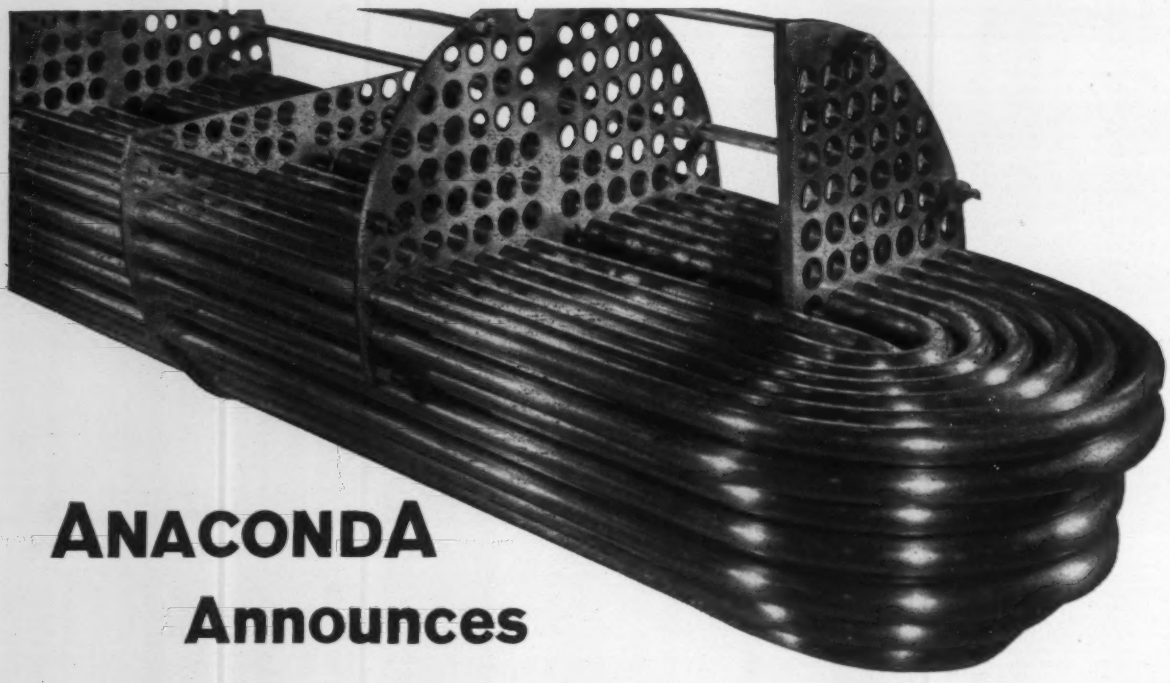
On the West Coast—Air Reduction Pacific Company
Division of Air Reduction Company Inc.
Authorized Airco Distributors in most principal cities



ANACONDA Announces

A new high-strength copper-nickel-iron tube alloy that makes possible substantial economies in feedwater heaters

Research metallurgists of Anaconda American Brass Company have developed, after three years of intensive effort, a new high-strength copper-nickel-iron alloy — Cupro Nickel, 30%-707—for heat exchanger tubes in power plant feedwater heaters.

Alloy 707 has mechanical properties comparable with those of a premium high-strength alloy now commonly used, and retains its strength at elevated temperatures—allowing working stresses up to 15,200 psi at 600° F. Thus, in an important area of high-temperature heater application it provides material-cost advantages.

And as these high mechanical properties are for the metal in the *annealed* condition, Alloy 707 tubes can be readily cold worked—can be expanded into tube sheets and formed into tight U-bends.

MECHANICAL PROPERTIES of Cupro Nickel, 30%-707 (nominal composition, copper 64.15%, nickel 30.00%, iron 5.25%, manganese 0.60%) are as follows:

Tensile Strength, min, psi	74,000
Yield Strength, (0.5% Extension under Load), min, psi	36,000
Elongation, % in 2", min.	30
Expansion of Tube Inside Diameter with Tapered Pin, %, min	30

STRENGTH AT ELEVATED TEMPERATURES. Extensive tests at room and elevated temperatures show that design stresses given below can be used for Alloy 707:

Maximum Metal Temperature, °F	Maximum Allowable Stress Values in Tension, psi
100	18,300
150	17,800
200	17,500
250	17,100
300	16,800
350	16,400
400	16,100
450	15,900
500	15,600
550	15,400
600	15,200

WELDABILITY. Alloy 707 can be welded by the same methods used for regular 30% cupro nickel.

CORROSION RESISTANCE. Alloy 707 has the same high resistance to stress-corrosion cracking and the same excellent resistance to corrosion by salt water as regular 30% cupro nickel.

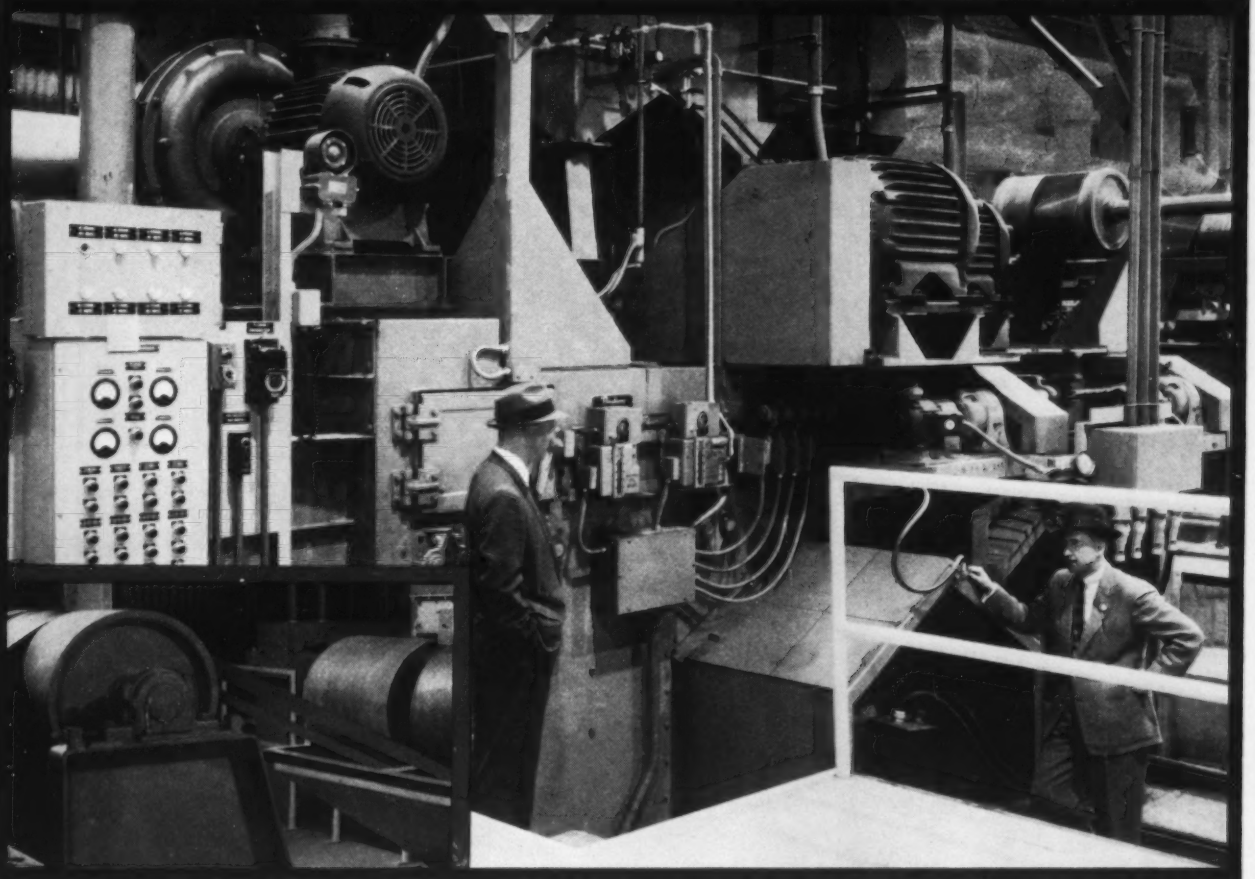
FOR MORE DETAILED INFORMATION on this new high-strength tube alloy, Cupro Nickel, 30%-707, see your Anaconda representative, or write: Anaconda American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

ANACONDA®

TUBES AND PLATES FOR CONDENSERS AND HEAT EXCHANGERS

Anaconda American Brass Company

PUSH-BUTTON DESCALING WITH ROTOBLAST!



Universal Cyclops uses Pangborn Rotoblast Descaling for flexibility in automation

Devoted entirely to the production of cold rolled stainless steel strip, the new Coshocton, Ohio plant of Universal Cyclops Steel Co. is one of the most completely modern plants in the country.

Among its advanced equipment, the company uses a Pangborn Rotoblast Descaling Machine in a 659 ft. fully-automated line. This machine—requiring no operator—continuously blast cleans two strands of steel simultaneously at speeds up to 80 LFM. To provide a high degree of flexibility, it has individual strand control and permits changing the position of Rotoblast wheels at the touch of a button. Abrasive velocity and volume are also variable and two-speed motors give a choice of 50 h.p. at 1200 RPMs or 75 h.p. at 1800 RPMs, depending on type and thickness of work.

Rotoblast's efficiency and adaptability to individual descaling problems have proved the value of Rotoblast to Universal Cyclops. They can in your plant. For more information, talk to the Pangborn man in *your* area or write PANGBORN CORPORATION, 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment—Rotoblast Steel Shot and Grit.* ®

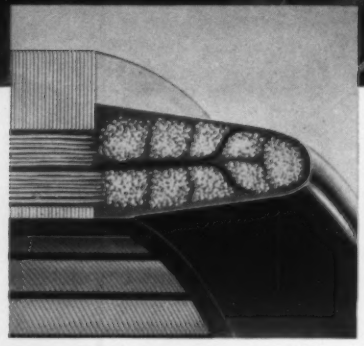
Pangborn

Cleans it fast with **ROTOBLAST®**

U.S. EVERSEAL

Protects against heat... water... chemicals

U. S. EVERSEAL resin-encapsulated windings are completely protected against severe environments: Heat, cold, vibration, acids, gases (even in high concentrations), lye, potash, ammonia, caustic soda, salt, abrasives, carbon black, graphic dusts, and many other conditions that formerly meant short motor life. In many applications, EVERSEAL provides the protection of totally-enclosed motors while still maintaining the higher service factor of open motors. U. S. Motors developed a way of molding without excessive thickness. Fully molded U. S. EVERSEAL *complete encapsulation* is available on any U. S. motor, ½ h.p. to 125 h.p. On higher horsepower motors, U. S. offers EVERSEAL silicone rubber insulation. *Request free* EVERSEAL *literature.*



Note complete coverage and protection provided by molded end-turn construction.

U.S. ELECTRICAL MOTORS INC.

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